TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XIV JUNE 15, 1925 NUMBER 10

THE NEWPORT COLORS

Vat Dyes

A new addition
to the famous line of Anthrene Blues

Newport Anthrene Blue 3GX

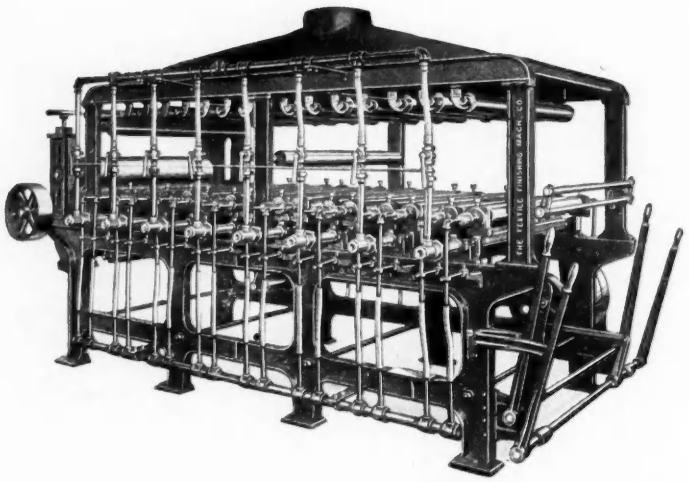
a rich, full, greenish blue of
great fastness and easy
working conditions

NEWPORT
REG. U.S. PAT. OFF.
"COAL TO DYESTUFF"

Newport Chemical Works, Inc.
Passaic, New Jersey

BRANCH OFFICES AND WAREHOUSES:
Boston, Mass.; Providence, R. I.; Philadelphia, Pa.; Chicago, Ill.; Greensboro, N. C.

SINGERS OF ALL KINDS BOTH PLATE AND GAS



THE ILLUSTRATION SHOWN ABOVE IS AN 8-BURNER GAS SINGER OF OUR STANDARD CONSTRUCTION. THESE MACHINES ARE FURNISHED WITH BURNERS FOR CITY GAS, OR IF DESIRED WITH BURNERS FOR GASOLINE GAS. IN ADDITION TO MANUFACTURING SEVERAL TYPES OF THESE MACHINES IN ALL WIDTHS AND NUMBERS OF BURNERS, THIS COMPANY ALSO MANUFACTURES OIL BURNER PLATE SINGERS AND ALL KINDS OF MACHINERY FOR BLEACHING, MERCERIZING, DYEING, DRYING, PRINTING AND FINISHING TEXTILE FABRICS AND WARP YARNS.

MAIN OFFICE AND WORKS:
PROVIDENCE, R. I.

NEW YORK OFFICE:
30 CHURCH STREET

THE
TEXTILE-FINISHING
MACHINERY
CO

CANADIAN REPRESENTATIVE:
WHITEHEAD, EMMANS, LTD.
MONTREAL, P. Q.

SOUTHERN REPRESENTATIVE.
H. G. MAYER
CHARLOTTE, N. C.

American Dyestuff Reporter, Vol. XIV, No. 10. June 15, 1925. Published twenty-two times a year by Howes Publishing Co., Inc., 90 William Street, New York, N. Y. Domestic subscription $5.00; Canadian, $5.50; foreign, $6.00. Entered as second-class matter Nov. 6, 1919, at the New York, N. Y., Post Office, under the Act of March 3, 1879. Copyrighted, 1925, by Howes Publishing Co.

DU PONT DYESTUFFS

GALLOPONT COLORS

(Patent Applied For)

THIS series of dyestuffs, prepared for the textile printing industry, offers most brilliant shades in a wide and complete range of colors.

Combining simplicity of application and uniformity of results, they should commend themselves quickly to the consumer seeking these essential features.

The Gallopont Colors offer the following outstanding advantages:

1. Ease of application.
2. No mordants required.
3. Steaming unnecessary.
4. Whites are left exceptionally clean.

In light shades particularly, the Gallopont Colors are characterized by uniformity and extreme brilliancy.

Literature, samples and technical assistance are offered to the textile printing industry.

E. I. DU PONT DE NEMOURS & CO., INC.

Dyestuffs Department

WILMINGTON DELAWARE

SOLVAY

STANDARD IN SODA SINCE 1881

Flake Caustic Soda

Solvay Flake Caustic Soda, 76%, as indicated by its name, is a product prepared in thin wafer or flake like form, suitable for all purposes for which ground caustic is used, but possessing physical properties which make it more desirable for handling. The flakes vary in thickness from 1/32" to 1/16" with an average area of 1/2" square. It will be recognized at once that this flake caustic soda offers a great advantage to the man who uses this material in small batches.

Solvay Flake Caustic Soda is white in color, free from dust, less hygroscopic than ground caustic, and, therefore, will not solidify in the barrel and form lumps.

Ask for our booklet "Solvay Flake Caustic Soda 76%"

The Solvay Process Company

Detroit, Mich. Syracuse, N.Y. Hutchinson, Kans.

WING & EVANS, Inc.
40 Rector Street

Sales Department
New York

Boston Cincinnati Chicago Cleveland Syracuse Detroit Indianapolis Pittsburgh

HYDROSULFITE

AN improved process in the manufacture of Hydrosulfite enables us to offer a uniform product, completely soluble, that will not precipitate inactive metallic matter in the stripping bath.

May we submit sample and price?

ARKANSAS CO., Inc.

233 BROADWAY
NEW YORK CITY

Röhm & Haas Company, Inc.

We have specialized in the manufacture of

Hydrosulfites

and Allied Products

Lykopon—Anhydrous Sodium Hydrosulfite for reducing indigo and vat dyes, for stripping, etc.

Formopon—Sodium Formaldehyde Sulfoxylate for discharge printing.

Indopon W—Indigo Discharge Assistant.

Formopon Extra—Basic Zinc Formaldehyde Sulfoxylate for stripping dyes.

Protolin—Soluble normal Zinc Formaldehyde Sulfoxylate for stripping dyes.

Protolin AZ—A special soluble Sulfoxylate for stripping dyes.

Our laboratory makes a special study of these products and their application, and appreciates the opportunity of co-operating with users in solving any problems which the employment of these products presents. Suggestions for stripping dyes from all classes of goods are supplied on request.

We also manufacture in our own plants a wide range of Heavy Chemicals, including Acids, Sodium Sulfide, Glauber's Salt, Aluminum Sulfate, Aluminum Chloride, liquid and crystals, Tartar Emetic, etc.

Office
40 North Front Street
PHILADELPHIA

Factories
Bristol and Bridesburg, Penna.
Branches
Chicago, Ill. Gloversville, N.Y.
Boston, Mass.

LESS WORRY

There is nothing that takes the joy out of business quicker than worry over your raw materials—whether it refers to quality, deliveries or the firm behind the product

International Salt users enjoy worry-less days insofar as their salt supplies are concerned. International Salt refineries are the last word in modern salt purification, and deliveries of this quality product are prompt. The business methods of the organization behind International Salt are on a par with the quality of the product.

SCRANTON PA.

INTERNATIONAL SALT COMPANY, Inc.

NEW YORK OFFICE 2 RECTOR ST.

Made in America

USE "CAMEL" DYES

—for silk

for fastness to light and washing

FAST SILK BLUE 6 G
FAST SILK BLUE 8 G

Greener, brighter, faster and stronger than Direct Fast Blue 4 G L on silk
Fast to one per cent neutral soap for fifteen minutes at 140° F.
Draws with Glauber salt and soap on silk **Dyes silk and artificial silk same shade**

Recommended for Washable Shirtings and Dress Goods

WRITE FOR SAMPLES AND PRICES

Manufactured by

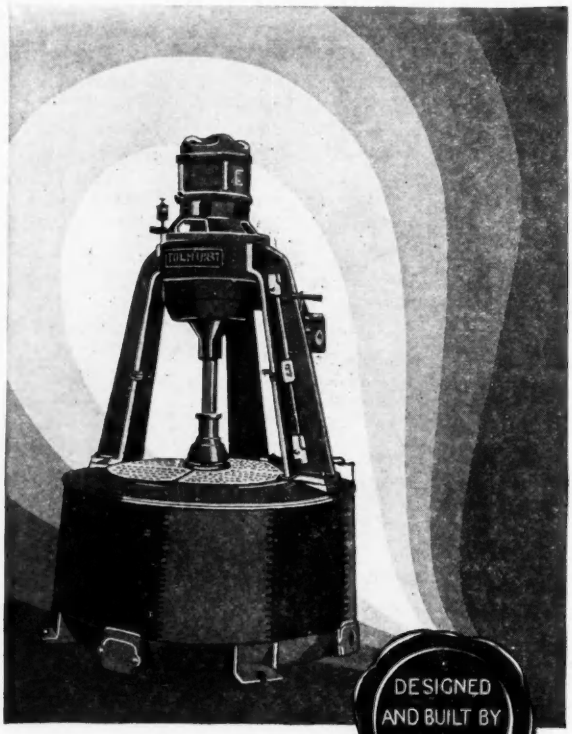
JOHN CAMPBELL & COMPANY

75 Hudson Street *American Dyestuff Manufacturers* New York, N. Y.

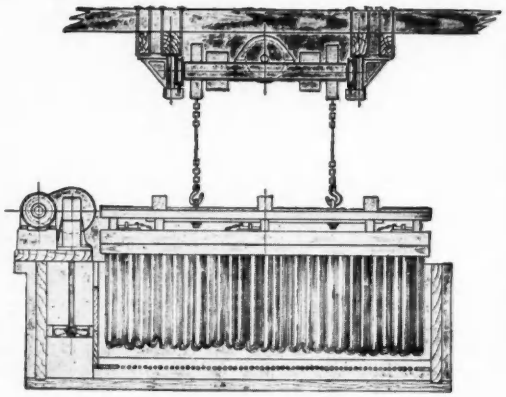
BRANCHES AND WAREHOUSES

BOSTON CHICAGO PROVIDENCE CHARLOTTE PHILADELPHIA

"STANDARDS EVERYWHERE"



TOLHURST
CENTRIFUGAL
EXTRACTORS
TOLHURST MACHINE WORKS Established 1852. Troy, N.Y.



Patented split yarn rack.

Skein Machines for Dyeing or Bleaching, with Split Yarn Racks

With each top there are two sets of bottom rails. While one set is in the machine the other may be loaded or unloaded. It is not necessary to handle the skeins until they have thoroughly drained. Owing to the quick loading and unloading the output is increased.

Patentees and Sole Manufacturers

Hussong Dyeing Machine Co.
GROVEVILLE, NEW JERSEY

Vertical Type Extractor

Day in and Day out

FLETCHER
Motor-Driven
EXTRACTORS

run along without annoyance or trouble.

That is because of the sturdy construction and the small number of moving parts.

Let us tell you what some satisfied users think of them.

FLETCHER WORKS
Incorporated
(Formerly Schaum & Uhlinger)
Glenwood Avenue at Second St. Philadelphia, U. S. A.

French Lick Springs Hotel

The All-Year Convention Site

French Lick Springs Hotel, accessibly located in the Cumberland foothills region of Southern Indiana is now more than ever the place for conventions with its new, 1500-seat convention auditorium, amply ventilated by outside windows on all four sides.

Healthful, natural spring waters of world-wide fame, two excellent 18-hole golf courses, horseback riding, tennis and hiking are among the attractions at French Lick. Rooms and meals are included in the rate. Before you leave home, you can tell, almost to a dollar, what your expenses will be. Write for illustrated booklet and details of convention facilities.

Address Convention Secretary

FRENCH LICK SPRINGS HOTEL COMPANY
French Lick, Indiana
"Home of Pluto Water"

SANDOZ

Sandoz

ANILINE DYES for ALL TRADES

We announce another addition
to our line of Alizarine Colors

ALIZARINE LIGHT GREY BS

Excellent fastness to **light**, unequalled **level dyeing** properties and **stability of shade** against the action of metals are the outstanding features of this Alizarine Chrome Color

SANDOZ CHEMICAL WORKS

INCORPORATED

New York
238-240 Water Street

Philadelphia
12 South Front Street

Boston
36 Purchase Street

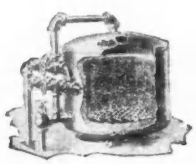
Paterson, N. J.
126 Market Street

Charlotte, N. C.
435 South Church Street

Providence, R. I.
813 Hospital Trust Bldg.

WATER

Zeolite Water Softeners
Rapid Sand Filters
Oil Removal Filters
Iron and Manganese Removal



Vertical steel pressure filter

The Permutit Company
440 Fourth Avenue, New York City
Branches and Agents in All Principal Cities

Long, Economical Service

Live steam, acids and alkalis tend to shorten the life and lower the efficiency of dyeing equipment. But some machines, like some men, seem able to withstand wear and tear better than others.

For instance, in many places through the United States as well as abroad, there are

KLAUDER-WELDON

Dyeing · Bleaching · Scouring

MACHINES

which, **built nearly half a century ago**, are still operating **economically.**

One of our experts will gladly discuss any dyeing difficulty or problem you may have.

Special Construction When Required

KLAUDER-WELDON DYEING MACHINE CO.

Originators · Pioneers · Leaders

BETHAYRES · PENNSYLVANIA

Even Dyeing Assured By Diastafor

—Standardized and reliable, Diastafor is the perfect de-sizing agent for the textiler

—Easy to use, it improves the quality of your fabrics and assures absolutely uniform dyeing.

The Fleischmann Company

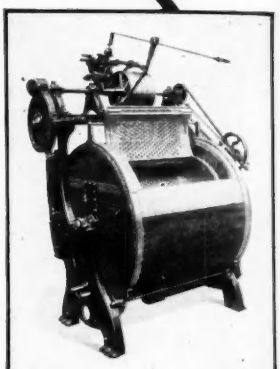
DIASTAFOR DEPT.

695 Washington Street New York, N. Y.

DIASTAFOR WAREHOUSES:

Boston, Mass. Cincinnati, Ohio New York, N. Y. Philadelphia, Pa.

American Rotary Hosiery Dyeing Machines



Hosiery of every kind can be successfully dyed any color in this Acme Monel Metal Lined Dyeing Machine. Also it produces perfect results in the bleaching of hosiery and in the boil off process. Priced within reach, too, of every manufacturer and dyer. Folio No. 708 gives full information—send for a copy.

The American Laundry Machinery Company

Specialty Department B

Norwood Station, Cincinnati, Ohio

The Canadian Laundry Machinery Co., Ltd.
47-93 Sterling Road,
Toronto, Ont., Canada

New York 2-4-6 Cliff St. Boston 40 Central St. Philadelphia 583 Drexel Bldg.

JOHN D. LEWIS

IMPORTER AND EXPORTER

DYESTUFFS and CHEMICALS

——Manufacturer of——

TANNIC ACID, COMMERCIAL
TANNIC ACID, U. S. P. AD C. P.
TARTAR EMETIC
ANTIMONY SALTS
CRUDE AND HALF REFINED TARTAR
ANTIMONY LACTATE
ACETATE OF CHROME
FLUORIDE OF CHROME
ACETATE OF IRON
NITRATE OF IRON
GALLIC ACID
DYEWOOD EXTRACTS
TANNING EXTRACTS

Jobbers Of
CHEMICALS :: STARCHES :: GUMS

PROVIDENCE, R. I.
Office: 1209 Turks Head Building
Works: Mansfield, Mass.

S. R. DAVID & COMPANY
INCORPORATED

Dyestuffs

252 Congress Street, Boston, Mass.

Tel. Main 1684

Unevenly Dyed
"Three-Fibre Hose"
Streaked Dyeing and
Smears on the Finished Hose

are generally caused by the fact that oils used for winding Artificial Silk are

NOT boiled out properly
"HYDROXY THREE FIBRE BOIL OFF OIL"

boils out these oils and **degums** the pure silk at the same time. The oils are held in suspension, preventing the streaking and the smears.

This should interest anyone making a hose or fabric from Art Silk, Pure Silk and Cotton or Worsted.

Manufactured only by

KALI MANUFACTURING CO.

1410 N. Front Street, Philadelphia, Pa.

Onyx Oil & Chemical Co.

Oils, Chemicals, Gums and Finishes
for the
THROWSTER, DYER, FINISHER AND PRINTER

Headquarters for

SANITOSE
Reg. U. S. Pat. Off.
A superior silk finish

SILTEX GUM
Reg. U. S. Pat. Off.
The new printing gum

DECERESENE
Reg. U. S. Pat. Off.
The chemical degummer

Office and Works: **Jersey City, N. J.**

Our Laboratory at your service.

COMPLETE
Laboratory Service
For Textile Mills

Dyestuffs Tested for
Identity, Fastness, Strength.

Dyestuffs on
Dyed Materials Identified.

THE facilities of our excellently equipped laboratory, and the services of our experienced textile chemists are available to textile mills on the basis of a moderate annual fee covering all routine work, or for special work upon a standard scale of prices.

Our wide experience in dyestuff chemistry, our modern apparatus, and, in particular, our files of type samples of over 3,500 different varieties of dyestuffs, make possible a most superior service.

Complete information will be furnished on request.

TINC TURA
Laboratories, Inc.

85 Fort Greene Place, Brooklyn, N. Y.

Service and Economy

SOME OF OUR PRODUCTS

NOIL

Direct Fast Scarlet B

Direct Fast Scarlet 3B
(Schultz No. 319)

Alizarine Red S Powder
(Schultz No. 780)

Peerless Primuline Superior

ALIZARINES BEAVER SULPHUR COLORS

ALIZARINE AND SULPHUR
SKY BLUES—GREEN AND RED SHADES

DUNKER & PERKINS CO.
New England Agents
263 SUMMER ST., BOSTON

Established 1895

BOSSON & LANE

Manufacturers of
The Original

BLEACHING OIL
for boiling out Cotton, to produce a foundation for a Pure White

High Grade Sulphonated and Saponified
CASTOR OIL PRODUCTS

Para Soap Oil

Solvents and Assistants for cleaning all Textiles

B & L Bleachers' Bluings and Tints

Works and Office, ATLANTIC, MASS.

WOLF BRAND
Specialized Textile Chemicals

For RAYON
and
FANCY COTTON GOODS

BOIL-OFF OIL
Makes goods more absorbent for dyeing—gives a better lustre—is cheaper and rinses out more freely than soap. Simplifies handling.

MONOPOLE OIL
Reg. U. S. Patent Office
Gives penetration—more level dyeing and increases the lustre. Prevents resist spots from lime soaps when water conditions are not just right.

A Product for Every Purpose
in
Textile Processing

Samples at All Times Available

JACQUES WOLF & CO.
MANUFACTURING CHEMISTS AND IMPORTERS
PASSAIC, N. J.

Western Representatives
ANILINE COLOR & CHEMICAL CO.
162 W. Kinzie St., Chicago 590 Howard St., San Francisco

Contents of This Issue

June 15, 1925

Dyeing Acetate Silk—Part VII..... 381
Charles E. Mullin

Standards for Testing Fastness Properties of Dyeings on Cotton and Wool..... 385
A. Kertess

Foreign Dyes Imported Through New York and Other Ports During May..... 386

Proceedings of the American Association of Textile Chemists and Colorists:

April Meeting of the Northern New England Section 389

Modern Chemistry and Textile Fibers—*A Paper* by Prof. Harold Hibbert.. 390

Discussion of Above Paper..... 393

Co-operative Textile Research
Prof. L. A. Olney..... 395

Discussion of Above Address..... 397

May Meeting of the Rhode Island Section 399

The Silk Industry—Past, Present and Future—*A Paper* by Walter M. Scott 399

Summer Meeting of the Southern Section—Notice 400

Notice of Summer Outing of the Northern New England Section..... 400

Applicants for Membership..... 400

Change of Addresses..... 400

Resigned 400

Obituary 400

Editorials.
Smashing a Trade Evil..... 401
The New Chemical Advisory Committee. 401

Moorhouse Becomes Assistant Sales Manager of National 402

Grasselli Acts to Protect Dye Patent Rights. 402

Initial Meeting of the Chemical Advisory Committee 402

Dyestuff Tables 407

Technical Notes from Foreign Sources... 409

Highs and Lows in a Busy Chemist's Life—Part V 411

Recent Patents 412

A New National Direct Dye

National Solantine Blue 4 GL is a recent addition to the important line of Solantine fast-to-light direct dyes. It produces bright greenish blue shades, possessing the greatest fastness to light of any of the direct sky blues. This new type possesses excellent solubility and level dyeing properties. It is useful for cotton and other vegetable fibres, and the various brands of artificial silk, with the exception of Acetate Silk. It does not dye animal fibres. Its resistance to the action of metals is such as to permit its use in all classes of dyeing machines. Hydrosulfite discharges it to a clear white.

Product samples with full particulars may be obtained from any National branch office.

National Aniline & Chemical Company, Inc.
40 Rector Street, New York, N. Y.

Boston
Providence
Hartford

Philadelphia
Chicago
Charlotte

San Francisco
Montreal
Toronto

NATIONAL DYES
FOR TEXTILES

NATIONAL N DYES

Calco

Calco Malachite Green

Malachite Green is a logical member of the Calco line of basic colors, for its preparation depends very largely upon Dimethylaniline, an important intermediate we have been manufacturing ever since the company was founded. Its use, like that of Methylene Blue and Methyl Violet, is very wide-spread throughout the textile, paper, lake manufacturing and other industries.

Calco Malachite Green V is standardized according to the way in which it is to be used. If it is to be dyed on cotton, a test is made on cotton; if on paper, a paper test is made; and if it is to be used as a lake, the batch is tested by the lake laboratory.

Specify Calco Malachite Green V and be sure of getting a product that has been especially chosen for your specific requirements.

THE CALCO CHEMICAL COMPANY
Bound Brook N. J.

New York Boston Philadelphia Chicago

Canadian Representative: Dillons, Ltd., Montreal, Toronto

AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

VOLUME XIV | NEW YORK, JUNE 15, 1925 | NUMBER 10

Dyeing Acetate Silk

Part VII

(Continued from page 380)

The Manufacture of Dyed Acetate Silk—Solvents in Dyeing Acetate—Dyeing by Saponification—Dyeing Saponified Acetate Silk with Direct, Sulphur, Vat or Basic Dyes

By CHAS. E. MULLIN, M. Sc., F. A. I. C.

(All rights reserved by author.)

IN British Patent No. 1556 (1911) to F. Bayer & Co., the patentee proposes to overcome the difficulty in dyeing acetate silk by dyeing the cellulose with dyestuffs capable of withstanding acid treatment before acetylation, and then acetylating the dyed cellulose. They propose Algol, Indanthrene, sulphide and other dyes. For example, 200 parts of cotton may be dyed with 10 per cent of Kaligen Brilliant Green G and then acetylated as usual.

United States Patent No. 994,738, June 13, 1911, to E. Friedman (F. Bayer & Co.), also covers a method of manufacturing a dyed acetate silk. This process is similiar to that preceding, British Patent No. 1556, but they propose to use Algol Red, Helindone Scarlet, Rosanthrene, Diazo Brilliant Scarlet, Algol Blue, Indanthrene Blue, Katigen Brilliant Green, Katigen Violet, Diazo Indigo Blue, Katigen Black or Immedial Black. They state that these colors resist the acetylation and that in most instances the color is even purer after acetylation. They are very fast to light.

Solvents in Dyeing Acetate Silk

Method No. 51: The first patented method of dyeing acetate silk appears to be that of the Aktien-Gesellschaft fur Anilin-Fabrikation, in German Patent No. 193,135, July 5, 1905. British Patent No. 1939, January 25, 1906, to C. D. Abel appears to cover the same process. In these patents it is stated that acetate silk which cannot be dyed by either an aqueous or alcoholic solution of Methylene Blue, may be dyed in a dye bath containing both of these solvents. For example, he states that ten parts of acetate silk may be dyed in about fifteen minutes in a bath containing two parts of Methylene Blue dissolved in a mixture of 200 parts of water and 150 parts of alcohol. Further examples cover the use of Magenta, Naphthol Yellow S, Erika B, Poncean 4GB and Chrysoidine, in amounts varying from 20 to 50 per cent on the weight of the fiber. Methanol, acetone, acetic acid or other suitable solvents that are miscible with water, and in which the dye is soluble, may be substituted for the ethyl alcohol. Aniline in aqueous solution is also mentioned and dyes of the basic, anthracene and vat classes are suggested for use by this method.

Method No. 52: The French Patent No. 362,721, January 26, 1906, to the same patentees appears to cover a similar process. This proposes to pass the material through a bath containing the dye, organic solvent and water. For instance, 0.2 part of Fuchsine is dissolved in 50 parts of water and 50 of acetone. About 2 parts of acetate silk are worked in this bath for one-half to one hour, after which it is washed. One part of Naphthol Yellow S in 50 parts of water and 50 parts of alcohol may be used, working the acetate silk for one hour at 70 deg. Cent. (158 deg. Fahr.)

Method No. 53: The French Patent No. 383,636, November 6, 1907; German Patent No. 199,559, February 19, 1907; British Patent No. 24,284, November 2, 1907, and United States Patent No. 961,241, June 14, 1910, to Knoll & Co., cover the use of organic solvents in dyeing acetate silk. They state that if the fiber is soaked for some time in solutions of various organic substances, such as 50 per cent aqueous alcohol, or dilute acetic acid, at ordinary temperatures, the fiber swells, and after hydroextracting it may be dyed in the ordinary manner. They suggested the anthracene dyes as well as the basics and mention the fiber's affinity for various amines and phenols or their derivatives. For example, acetate silk may be soaked for three hours in a 2 per cent aqueous solution of aniline and then diazotized with an acidulated

solution of nitrite, after which it may be developed with a 2 per cent sodium naphtholate, thus producing Sudan I on the fiber. Or the impregnated material may be treated with a warm dichromate solution and hydrochloric acid to produce Aniline Black. Paranitraniline Red can be produced by soaking the fiber in a 0.5 per cent solution of *B*-naphthol and then developing in a solution of diazotized paranitraniline, or by soaking in a paranitraniline solution, rinsing, diazotizing and combining with *B*-naphthol. The use of sodium acetate to increase the absorption of bases in the production of azo dyes on the fiber is also suggested. Glacial acetic acid, alcohols, ether, soap, phenol, naphthol, aromatic organic bases, etc., are suggested as suitable solvents.

In an addition to the above French patent, dated April 5, 1909, the use of inorganic acid such as hydrochloric acid, in place of the organic substances or their solutions, as mentioned in the principal patent, for treating the acetate silk is covered. They state that this treatment with inorganic acids also has the effect of swelling the fiber and increasing its elasticity without any appreciable hydrolytic dissociation. British Patent No. 7743, March 31, 1909, covers this addition. United States Patent No. 979,966, December 27, 1910, to E. Knoevenagel, specifies aqueous solutions of phenol, *B*-naphthol or *p*-aminophenol.

German Patent No. 234,028, February 21, 1908, to Knoll & Co., and United States Patent No. 981,574, January 10, 1911, to E. Knoevenagel, covers the use of hydrochloric acid, but also mentions hydrobromic, nitric and sulphuric acids.

Farbenfabriken vorm. F. Bayer & Co. also obtained British patent No. 215,373, May 1, 1923, covering the use of pyridine or one of its homologs in dye baths containing basic dyes such as Diamond Fuchsine, China Green, etc. The dyeing takes place at 60 to 70 deg. Cent. (140 to 157 deg. Fahr.), and the pyridine is removed from the material by acetic or formic acid. W. Harrison and Burgess, Ledward & Co., have obtained British Patent No. 190,313, October 27, 1921, on the dyeing of cellulose triacetate, as well as the other acetates, with dyestuffs containing an azo group associated with one or more alkylamino groups but not containing sulphonic or carboxylic groups directly attached to carbon atoms in the benzene nuclei. Such dyes are usually soluble in acetic and formic acids, and are mainly yellow, orange or red in color. They are usually applied at 70 to 80 deg. Cent. (158 to 176 deg. Fahr.).

Dyeing by Saponification

One of the first more or less successful special methods of applying certain dyes to acetate silk was by the saponification, hydrolysis or deacetylation process, wherein the cellulose acetate ester (fiber) was treated with an alkaline solution, usually a caustic solution, sufficiently strong to partially saponify the outer layer of the fiber by the removal of acetyl groups or radicles. This method was possibly suggested by the regeneration of the cellulose in Chardonnet silks, as by this treatment the cellulose acetate is partially reconverted into cellulose or hydrocellulose. The amount or depth of the regeneration or saponification depends upon the variety of alkali used in the solution, the strength and temperature of the bath, and the length of time in which it is allowed to act on the fiber. This regenerated cellulose has dyeing properties resembling cotton or the other artificial silks of cellulosic composition. It can, therefore, be dyed with direct cotton, sulphur, vat or basic dyes, either directly or with mordants. In applying many dyes, the dyestuff itself may be placed in the saponifying bath, the dyeing and saponification proceeding concurrently. Salt may also be added to the alkali bath containing the dyestuff, to aid exhaustion.

A complete saponification of the cellulose acetate resulting from the removal of all acetyl groups, would give a cellulose silk comparable with the ordinary denitrated Chardonnet silk, and the product would have lost the most desirable properties of acetate silk. A partial saponification can take place in two ways, either the alkali can penetrate and then saponify, the result being a general and uniform lowering of the acetyl value of the total ester; or it may saponify immediately as it comes into contact with the surface of the fiber, before it penetrates into the interior. This, of course, results in a superficial coating of hydrated cellulose, graduating up to unmodified cellulose acetate in the interior. The latter appears to give the best results, and is obtained either by using dilute caustic solutions at high temperatures or with strong caustic solutions at lower temperatures.

While in the saponification process a part of the acetyl groups in the cellulose acetate molecule are replaced by hydroxyl groups, it is, of course, understood that the resulting product will possess very different properties from an incompletely acetylated cellulose. However, this method has never been very widely adapted and it is extremely difficult to secure absolutely level shades in this manner in a practical way. Also the acetate silk loses in weight as well as some of its most valuable properties, such as luster, strength, water resistance, etc., depending upon the extent of the saponification. The unevenness may be due to uneven saponification or hydrolysis caused by minor variations in the chemical composition or physical structure of the acetate silk fiber.

While the original patent on the saponification method of dyeing acetate silk was taken out by H. S. Mork of the Lustron Company, and the British Cellulose & Chemical Company hold numerous patents on saponification processes, neither company recommend this process in their latest literature on dyeing acetate silk. In the case of Lustron this is possibly accounted for by the modified manufacturing process of the Lustron Company, so that their product is more readily wet out by aqueous solutions than was the original cellulose acetate. This may be the result of some special finishing treatment. The higher affinity of this product for the basic dyes, which it will pull away from any other fiber, makes it particularly

adaptable for dyeing with these products, the resulting colors often having a surprising and unexpected fastness on Lustron.

In the case of Celanese which does not have such a high affinity for the basic dyes, the recent discovery of the Ionamines and the later dispersol dyes renders the saponification process unnecessary. Of course, these dyes are invaluable on Lustron also. Recent literature on dyeing artificial silks by the Newport Chemical Works (Bulletin A, Series 2), gives the process in detail and states that the saponified acetate silk has dyeing properties practically the same as viscose artificial silk. They recommend Method No. 54. However, the process still has some use on certain products, and in connection with union dyeing, so details will be given. As before stated, the original patents on the saponification process of dyeing acetate silk were granted to H. S. Mork, in French Patent No. 146,762, June 4, 1910, and British Patent No. 20,672, September 5, 1910. Many later patents were granted, mostly to English inventors.

Method No 54: The Saponification Process.—The saponification process of dyeing is covered by many patents, as, for instance, British Patents No. 169,741 (1920), to the British Cellulose & Chemical Manufacturing Company. The following example is given from the patent literature: After thoroughly scouring the silk with soap and ammonia as in Method No. 1, etc., it is saponified in a bath containing 100 gallons of water for each 10 pounds of dry Celanese silk and 30 per cent of 72 deg. Tw. caustic soda, calculated on the weight of dry Celanese. The bath is heated to 75 deg. Cent. (167 deg. Fahr.) and the silk entered at this temperature. After being worked well at this temperature for forty-five minutes, the acetate silk is washed in warm water until free of alkali, scoured in weak acetic acid solution, rinsed again, washed in soft water and lightly soaped. Where the silk is to be dyed immediately the scouring may be omitted.

This particular method is stated to apply especially to acetate silk containing 2 to 2.5 acetyl groups per molecule of cellulose, and temperatures from 40 to 80 dg. Cent. (104 to 176 deg. Fahr.) are mentioned as suitable. The quantity of alkali is to be restricted to that necessary to produce not more than 10 per cent loss in weight in the acetate silk originally present. Sodium hydroxide or carbonate, or potassium hydroxide in not over 1 per cent concentration are suggested as suitable alkalies. The above formula gives about the 10 per cent loss in weight usually desired. A provisional specification covers the saponification of any acetate lower than the triacetate and states that the restricted saponification may also be effected by using an excess of saponifying agent and limiting the time of action. It also refers to British Patent No. 158,340, covering the use of ammonium thiocyanate as in Method No. 50. The loss of weight upon saponification is stated to be one of the most serious drawbacks to this method of dyeing and the loss is usually about equal to the actual weight of caustic soda used in the saponification treatment.

Cross and Dreyfus, in British Patent No. 125,153, June 19, 1916, suggested the use of an ethyl or methyl alcoholic medium with a fractional equivalent of alkali or base so that the alcohol of the medium takes part in the subsequent decomposition of the acetate silk. British Patent No. 150,989, May 17, 1920, and United States Patent No. 1,366,023 to the Society Chimique des Usines du Rhone, anciennement Gillard, P. Monnet, et Cartier, covers the use of hot or cold solutions of metallic salts, to which alkali has been added, and mentions sodium chloride and hydroxide. British Patent No. 183,806, May 17, 1922, and United States Patent No. 1,440,501, January 2, 1923, to the same society covers the partial saponification of acetate silk by means of trisodium phosphate, prior to or during dyeing.

Method No. 55: British Patent No. 192,994, April 19, 1922, an addition to the above patent No. 150,989, to the same patentees, covers the use of a neutral salt of an alkali metal, to which has been added, in the place of the alkali, as in the principal patent, a salt having an alkaline reaction adapted to the effect the desired saponification. For example, 100 g. acetate silk may be soaked in a 2 liter bath containing 800 g. of sodium sulphate and 15 g. of trisodium phosphate for about 1 hour at 70 to 80 deg. Cent. (158 to 176 deg. Fahr.), or until the solution fails to react alkaline. It is then washed and dyed. Sodium borate, silicate and carbonate are also mentioned.

British Patents No. 193,912 and 194,244, November 2, 1921, to W. Bader and the British Cellulose and Chemical Manufacturing Company cover the partial saponification of acetate silk with a 2 to 15 per cent solution of caustic soda, controlling the saponifying action by means of low temperatures, by adding alkali metal salts, or by the precipitation of insoluble soap films on the fiber. For example, the acetate silk may be saturated with a solution of soap and afterward treated with brine, whereby the fibers become coated with a protective film of soap. They are then treated with a 10 per cent solution of caustic soda for 15 to 20 minutes. Or the acetate silk may be first treated with concentrated solutions of such salts as the chlorides of sodium, calcium or magnesium, after which the saponification is claimed to be more regular. Small amounts of alkali or alkali-earth hydroxides may be added to the saline solution. This preliminary treatment has a specific action on the acetate silk, so that the superficial saponification effect can be obtained even when the salts employed have been completely washed out of the fiber. For example, acetate silk is soaked for two hours in a 25 per cent solution of sodium chloride, or boiled for ten minutes in the solution. It is then saponified in a cold 5 per cent solution of caustic soda. It is claimed that the dyeing properties are greatly improved, while the loss in weight is only 1 to 2 per cent on the acetate silk.

Method No. 57: Saponification in the Presence of Solids.—In British Patent No. 195,920, November 2, 1921, to Bader and the British Cellulose and Chemical Company, the partial saponification of acetate silk is ef-

fected in a cold 1 per cent caustic alkali solution, the action of which is accelerated by the presence of finely divided solids, either suspended in the saponifying bath or precipitated on the fiber. Clay, alumina or silicic acid gel, prepared so as to be insoluble in cold dilute alkali, may be added to the caustic solution, or the fiber may be treated in such a manner as to form insoluble precipitates on it, such as calcium carbonate, magnesium oxide or carbonate, aluminum or calcium oleate, etc. In a modification, alkali aluminates are dissolved in the saponifying liquid, and these deposit a colloidal hydrosol on the fiber. For example, acetate silk may be soaked for two hours in a 25 per cent solution of sodium chloride as in Method No. 56, then squeezed and suspended in a 40 to 1 solution containing 30 per cent of aluminum sulphate (on the weight of the fiber) and sufficient caustic soda to convert it into sodium aluminate ($NaAlO_2$) and excess of caustic soda equal to 10 per cent of the weight of the acetate silk. Saponification is complete in about two hours.

Richardson in United States Patent No. 1,442,631, January 16, 1923, patented the use of sodium acetate in alkaline saponifying baths, and Sisley in United States Patent No. 1,440,501, January 2, 1923, covered the use of sodium phosphate for the same purpose. British Patent No. 175,486 (1920), to the British Celanese Company covers the use of alkali silicates, aluminates and borates in the saponifying baths to give more level saponification. Method No. 58 may be along the line intended in this patent. It is stated to give better results than Method No. 54. British Patents No. 11,886 (1920) and 176,034 (1920) also cover the saponification process, the latter specifying the use of up to 5 per cent, but preferably 1 to 2 per cent of sodium acetate to control the saponification.

Method No. 58: Saponification by Sodium Silicate.—The acetate silk is treated with a 5 deg. Tw. sodium silicate solution containing 5 per cent, on the weight of the acetate silk, of neutral olive oil soap. The silk is entered cold, the temperature slowly raised to 40 deg. Cent. (105 deg. Fahr.) and held there for one hour while working the material well. The acetate silk should be rinsed well before dyeing. The loss in weight of the acetate silk by this method is only about 5 per cent. While this method recommends entering the acetate silk cold and then gradually heating the bath, it has been stated that more level results are obtained by entering fiber directly into the hot saponification bath.

According to British Patent No. 209,849, October 21, 1922, to Badische Anilin und Soda Fabrik, the alkaline saponification of acetate silk may take place in the presence of soluble aldehydes or hydroxy aldehydes, or their salts, or mixtures of the above aldehydes and acids. The process may be varied to give the fiber either an increased or decreased affinity for dyes. French Patent No. 558,900 covers a similar process, in which neither the strength or luster of the acetate silk is impaired. The treatment may take place prior to or during the dyeing process.

Method No. 59: For example, 25 g. of acetate silks are treated at 60 deg. Cent. (140 deg. Fahr.) for ten minutes with a liter of 5 deg. Be. barium hydroxide solution to which has been added 500 c.c. of 30 per cent formaldehyde. The fiber is then dyed with a vat dye, as for instance Anthraflavone GC, in a hydrosulphite vat. Caustir soda may be used in place of the barium and formaldehyde-bisulphite, acetaldehyde, acetaldehyde-bisulphite, formaldehyde-sulphoxylate, glyoxal sulphate or glyoxylic acid may replace the formaldehyde.

Possibly the most satisfactory method of controlling the saponification is to use a certain definite quantity of caustic and allow it to act to complete exhaustion. In this manner a certain definite amount of saponification is obtained and no more. The extent of the saponification may be determined by repeatedly extracting the partially saponified acetate silk with dry boiling acetone, which dissolves only the unsaponified cellulose acetate. The insoluble residue consists of cellulose and acetate so altered as to be insoluble in the acetone. The analysis may be carried further by extracting this residue three times for two minutes each with ten times its weight of cuprammonium reagent, which entirely removes the saponified cellulose acetate. The cuprammonium extract is acidified and the precipitate washed, dried and weighed.

Method No. 60: Dyeing Saponifed Acetate Silk with Direct, Sulphur, Vat or Basic Dyes.—The saponified acetate silk is dyed in exactly the same manner as viscose artificial silk, except that temperatures below 75 deg. Cent. (167 deg. Fahr.) should be used. The sulphur dyes are usually applied to the unsaponified acetate silk in a strongly alkaline bath, whereby the saponification and dyeing occur concurrently in the one bath. Many other dyes may be applied concurrently also. However, this method is subject to the same criticisms as the other methods of dyeing by the saponification process, and usually better results are obtained by saponifying and dyeing in separate baths. In short the saponification process is hard to control, the fiber loses weight, luster, strength and cross dyeing properties, and also shrinks somewhat in the process.

The following dyes have been particularly recommended for the saponified acetate silk. Those marked (*) have exceptional fastness to light. Chlorazol Fast Yellow B and Clorazol Fast Red FG 9202K are direct dyes which are not decomposed by sodium sulphide and may therefore be used in the same bath with sulphur dyes for shading.

Chlorazol Fast Yellow NX
Chlorazol Fast Orange D
*Chlorazol Fast Red K
Chlorazol Violet N
*Chlorazol Fast Blue 2B
Chlorazol Sky Blue GW
*Chlorazol Green BN
Chlorazol Dark Green PL
*Chlorazol Brown M
Chlorazol Black E extra

(*Continued on page* 410)

Standards for Testing Fastness Properties of Dyeings on Cotton and Wool

Report of the International Association of Chemists- Colorists

By A. KERTESS

(Translated from Melliand's Textilberichte by Albert P. Sachs, Technical Director, Universal Trade Press Syndicate)

DR. Krais, as secretary of the Fastness Commission, has already reported (Zeitschrift fuer angew. Chem. 1914, vol. 27, I, page 57) on the work conducted to test dyeings on cotton and wool, and I may be permitted to make a supplemental report on the same problem.

The testing of dyeings for fastness has always been a difficult task, especially as only the relative fastness can be determined. A dyeing cannot be classified simply as good or bad; the determination only of the degree of fastness is possible.

Occasion to investigate this problem fell within the province of the activities of the Fastness Commission which was appointed in 1911 by the Division of Color and Textile Chemistry of the Association of German Chemists.

The stimulus was provided by Dr. Krais who showed that it was desirable to find ways and means of increasing the fastness of dyes and that a commission appointed by the appropriate Division of Association of German Chemists should investigate the problem.

The method proposed by him, which was thoroughly gone over in the first meetings, could not accomplish the desired end. Dr. Krais believed that the Fastness Commission should undertake the task of determining what claims for fastness were to be applied to the various products of the textile industry in order to arrive at a state of affairs in which no dyes of unsatisfactory fastness would be used for textiles for which higher claims were made.

This idea seems justified but the actual carrying out of all such regulations offers considerable difficulties because they may easily lead to hampering difficulties in merchandising.

We know, for example, that all proposals to arrive at a classification of various textiles according to fastness have failed, and we need only recall the attempts made by Colbert who demanded that dyeings be classified as fast and as fugitive.

A manufacturer from Saxony who participated in the first session was strongest in opposing the proposal, and he took the viewpoint that if the fastness requirements were supported, the commission would also have to determine the selling prices of the various articles.

Under these circumstances it seemed to me more advisable to propose to the Fastness Commission that it should first fix authoritative standards for fastness determinations so that the actual degree of fastness under consideration might be determined on the basis of exact comparison types. This would be a problem which theoretically could be solved and would lead to the best progress in the fastness problem.

I was urged to this stand by the fact that as far back as 1892 the British Association had appointed a committee in Leeds to test the fastness of various dyestuffs. Professor Hummel conducted the work with great conscientiousness, but the results (Chemical News, 1893) were of minor importance as there were no bases by which the degree of fastness could be compared.

In order to measure fastness there must first of all be standards available to determine the degrees of fastness with exactness.

My proposals were accepted by the Fastness Commission which met under the chairmanship of Dr. Lehne, discussed with care in numerous meetings and improved. The results may be found in a small volume issued by the Fastness Commission called "Methods, Standards and Types for the Testing of the Fastness Properties of Dyeings on Cotton and Wool," published by the Verlag: Chemie of Leipzig and Berlin.

I may add that this little book, as is often the case with similar manuals, is not impressive in appearance, but it contains exact instructions as to how the various degrees of fastness on cotton and wool can be determined and in such a manner that they can unqualifiedly be considered as authoritative for manufacturer as well as for consumer. Everyone skilled in the art wherever he may be will always get the same figures or results.

In my opinion it will be of value for dyehouses, cotton printers, dyestuff manufacturers and all others interested in these industries to carry out their fastness determinations in the manner specified. In this way it is to be expected that such desirable improvements as may be proposed by various individuals will be incorporated in later editions.

The fastness determinations so far worked out are:

For Cotton—Fastness to light, to washing and boiling of dyed cotton in presence of white cotton, to water, to rubbing, to ironing, to sulphur, to perspiration, to alkali, to acid boiling, to acid, to laundering, to chlorine, to mercerizing.

For Wool.—Fastness to light, to washing in presence of wool, to washing in presence of cotton, to rubbing, to

(Continued on page 414)

Foreign Dyes Imported Through New York and Other Ports During May

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.
B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.
By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.
C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.
K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.
M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilinfabrik Boyer & Kegel, Furstenberg, near Leipzig. Founded 1882.
CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.
CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823
GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.
L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879
tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.
G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.
I—Gesellschaft fur chemische Industrie. Founded 1885.
S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888
NF—Niederlandische Farben-und-Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.
CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)
P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.
BAC—British Alizarine Co., Ltd., Manchester
BD—British Dyestuffs Corporation, Ltd., London.
Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.
CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.
Hol—L. B. Holliday & Co., Ltd., Huddersfield.
Scot—Scottish Dyes, Ltd., Grangemouth.

THE imports of coal-tar dyes for May, 1925, through the port of New York totaled 353,326 pounds, with an invoice value of $334,525. Imports of dyes through other ports included: Boston, 13,945 pounds, valued at $10,519; Philadelphia, 3,000 pounds, valued at $2,860.

Imports of Synthetic Dyes

1925—	Pounds	Invoice Value
January	403,984	$359,376
February	373,259	365,268
March	527,964	488,501
April	451,005	426,141
May	370,271	347,904
Total, five montrs	2,126,483	$1,987,190
1924—	Pounds	Invoice Value
January	283,643	$237,868
February	161,869	180,570
March	302,799	307,247
April	176,550	183,789
May	183,079	177,553
Total, five months	1,062,940	$1,087,027

Five Leading Dyes, by Quantity, Imported During May

	Pounds
Indanthrene Blue GCD (single strength)	16,520
Indanthrene Golden Orange R (s. s.)	15,755
Rhodamine B (s. s.)	14,390
Alizarine Paste 20 Per Cent	13,846
Ciba Scarlet G Extra (s. s.)	11,434

Dyes Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
August 31, 1924	507,338	1,081,287
September 30, 1924	559,661	1,111,656
October 31, 1924	552,556	1,050,037
November 30, 1924	553,760	1,031,460
December 31, 1924	575,051	1,086,108
January 31, 1925	571,371	952,202
February 28, 1925	566,038	961,406
March 31, 1925	653,020	1,050,539
April 30, 1925	668,365	1,048,324

Per Cent by Country of Shipment

	1925			
	May	April	March	Feb.
Germany	50	46	49	54
Switzerland	32	34	39	27
Italy	4	6	5	6
Canada	3	2	2	3
England	6	6	2	5
Belgium	2	3	2	3
France	2	2	1	1
Holland	1	1	..	1

Imports of Synthetic Aromatic Chemicals

	Pounds	Invoice Value
January	6,645	$26,831
February	5,088	18,875
March	11,018	21,040
April	15,020	33,543
May	8,761	13,216

Imports of Medicinals, Intermediates, Photographic Developers, and Other Coal-Tar Products

	Pounds	Invoice Value
January	177,268	$34,317
February	487,015	74,995
March	282,368	124,287
April	34,213	26,743
May	317,241	78,978

Imports of Color Lakes

	Pounds	Invoice Value
January	385	$728
February	2,112	1,926
March	5,422	2,061
April	15,660	6,167
May	1,600	1,079

The dyes in this report are grouped by Schultz numbers, and in the case of those which could not be identified by Schultz number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

DYES OF COAL-TAR ORIGIN*

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
11	Chlorazol Fast Orange D—(BD)	1,115
19	Fast Light Yellow 3G—(By)	
19	Kiton Fast Yellow 3G—(I)	
19	Kiton Fast Yellow R—(I)	4,165
42	Brilliant Lanafuchsine GG—(C)	2
88	Acid Anthracene Brown PG—(By)	528
118	Brilliant Geranine 2BN—(By)	
118	Geranine G—(By)	199
119	Diamine Rose BD—(C)	100
140	Chromocitronine R—(DH)	220
159	Acid Alizarine Black R—(S)	2,000
182	Brilliant Sulphon Red B—(S)	
182	Brilliant Sulphon Red 10B—(S)	3,000
194	Chicago Red III—(G)	2,204
206	Diphenyl Catechine G Supra—(G)	2,204
233	Cloth Red B—(By)	25
257	Cloth Fast Blue GTB—(I)	
257	Sulphoncyanine G—(By)	510
265	Acid Milling Black B—(G)	2,204
273	Diaminogene Blue NA—(C)	1,242
274	Black (Diaminogene) Extra—(C)	
274	Diazo Fast Black MG—(By)	1,058
296	Benzo Fast Yellow RL—(By)	311
319	Chloramine Red 3B—(S)	
319	Diamine Scarlet 3B—(C)	1,559
339	Diamine Orange B—(C)	1,300
343	Diamine Fast Red 8BL—(C)	952
348	Diphenyl Brown BBNC—(G)	2,204
358	Acetopurpurine 8B—(A)	300
392	Direct Fast Orange K—(I)	331
400	Brilliant Milling Red R—(C)	100
436	Columbia Black FF Extra—(A)	5
449	Trisulphon Brown B Conc.—(S)	3,001
457	Trisulphon Brown GG Conc.—(S)	5,004
476	Dianil Chrome Brown G—(M)	100
477	Congo Brown G—(A)	500
496	Setoglaucine—(G)	551
500	Setocyanine—(G)	110
503	Benzyl Green B—(I)	
503	Poseidon Green SGX—(B)	1,031
505	Acid Green Extra Conc.—(C)	
505	Light Green SF Yellowish XX—(B)	500
506	Erioglaucine X High Conc.—(G)	2,914
515	Methyl Violet Base—(B)	25
516	Crystal Violet Extra Powder—(B)	700
518	Ethyl Violet—(B)	500
522	Victoria Blue 4R—(I)	551
523	Fast Acid Green Extra Bluish—(Gr-E)	2,240
530	Acid Violet S4B—(C)	10
534	Acid Violet 7B Conc.—(B)	25
541	Brilliant Dianil Blue 6G—(M)	300
543	Patent Blue V—(M)	
543	Poseidon Blue BGX Conc.—(B)	1,300
546	Cyanole Extra—(C)	200
548	Acid Violet 6BN—(I)	
548	Acid Violet 6BNOO—(B)	1,402
551	Eriochrome Azurol BC—(G)	4,410
555	Aurine—(Lo)	560
562	Acid Blue RBF—(I)	1,102
565	Wool Blue 5B—(A)	300

*This table includes imports through the port of New York to the amount of 353,326 pounds, and also 13,945 pounds through the port of Boston and 3,000 pounds through the port of Philadelphia.

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
571	Rhodamine 6GDN Extra (s. s.)—(B)	
571	Rosazeine 6G Extra (s. s.)—(M)	7,750
573	Rhodamine B Extra (s. s.)—(B)	
573	Rhodamine B Conc. (s. s.)—(G)	
573	Rosazeine B Extra (s. s.)—(C)	
573	Rosazeine B Extra (s. s.)—(M)	14,390
603	Acridine Orange DHE—(DH)	
603	Brilliant Acridine Orange A—(DH)	1,983
606	Patent Phosphine GG—(I)	
606	Phosphine O—(M)	
606	Phosphine 3R—(A)	2,801
608	Patent Phosphine RRDX—(B)	509
617	Diphenyl Chlorine Yellow FF Supra—(G)	551
627	Chromacetine Blue S Extra—(DH)	220
635	Modern Violet—(DH)	881
649	Cotton Blue R Extra Conc.—(B)	
649	Meldola's Blue 3R Conc—(S)	1,100
660	Methylene Green P Extra—(I)	
660	Methylene Green W—(G)	1,212
661	Methylene Blue HGG—(B)	
661	Thionine Blue G—(I)	761
663	New Methylene Blue N—(M)	
663	New Methylene Blue NS Conc.—(S)	2,000
672	Azo Carmine GX—(B)	900
673	Rosinduline 2B Bluish—(K)	401
690	Diphene Blue R—(A)	1,000
733	Immedial Indogene GCL Conc.—(C)	500
746	Pyrogene Green GK—(I)	1,102
748	Hydron Blue R Powder (s. s.)—(C)	5,000
754	Kurgan Violet 3RX—(B)	500
759	Anthra Yellow GC Paste—(B)	
759	Anthra Yellow GC Powder—(B)	
759	Helindone Yellow AGC Paste—(M)	3,178
760	Helindone Golden Orange IG Dbl. Paste (s. s.)—(M)	
760	Indan. Golden Orange G Powder (s. s.)—(M)	1,200
761	Helindone Golden Orange IRRT Paste—(M)	
761	Vat Orange RRT Paste—(B)	
761	Vat Orange RRT Paste Fine—(B)	15,755
762	Vat Orange 4R Powder (s. s.)—(B)	800
763	Vat Dark Blue BOA Paste—(B)	2,366
765	Vat Black BB Dbl. Pst. (s. s.)—(B)	
765	Vat Blue Green B Dbl. Pst. Fine (s. s.)—(B)	2,468
778	Alizarine VI Extra Pure Paste—(B)	
778	Alizarine Red Paste—(M)	13,846
779	Alizarine Orange AO Paste—(BD)	
779	Alizarine Orange AO Pdr. (s. s.)—(BD)	2,807
779	Alizarine Orange R Paste—(M)	
780	Alizarine Red SV Powder—(B)	
780	Alizarine Red W Powder—(By)	1,300
785	Alizarine Red XGP Paste—(By)	
785	Alizarine Red YCA Paste—(BAC)	2,693
787	Alizarine Bordeaux B Paste—(By)	5
792	Cibanone Orange R Paste—(I)	
792	Cibanone Orange R Powder (s. s.)—(I)	4,074
793	Cibanone Blue 3G Paste—(I)	1,102
795	Cibanone Yellow R Powder (s. s.)—(I)	7,048
800	Anthracene Blue WB Paste—(B)	838
804	Alizarine Blue S Powder—(B)	1,271
819	Algol Red FF Exta Paste—(By)	
819	Vat Red FF Paste—(By)	1,221
820	Vat Brilliant Violet RK Paste—(By)	1,588
821	Vat Brilliant Violet BBK Paste—(By)	604
822	Indan. Orange RRK Pdr. (s. s.)—(M)	
822	Vat Brilliant Orange FR Pdr. (s. s.)—(Q)	3,728
825	Algol Red B Paste—(By)	
825	Algol Red B Powder (s. s.)—(By)	1,279
827	Anthra Claret R Paste Fine—(B)	640
830	Anthra Red RT Paste—(B)	950
831	Helindone Red DIBN Ex. Pdr. (s. s.)—(M)	
831	Vat Red RK Paste—(B)	198
832	Vat Violet BN Paste—(B)	
832	Vat Violet BN Extra Paste—(B)	931
838	Vat Blue RS Dbl. Paste Fine (s. s.)—(B)	1,944
839	Indan. Blue RK Powder (s. s.)—(M)	
839	Vat Blue RK Powder (s. s.)—(By)	992
840	Indan. Blue 3G Powder (s. s.)—(B)	1,180
842	Helindone Blue IGCD Dbl. Pst. (s. s.)—(M)	
842	Indan. Blue GCD Dbl. Pst. (s. s.)—(B)	
842	Indan. Blue GCD Powder (s. s.)—(M)	
842	Vat Blue GCD Dbl. Pst. (s. s.)—(B)	16,520
843	Cibanone Blue G Powder—(I)	881
843	Vat Blue GCN Powder (s. s.)—(B)	500
844	Vat Blue 5G Paste—(B)	1,548
847	Vat Green BB Paste—(By)	400
848	Anthra Gray B Dbl. Pst. (s. s.)—(B)	200
849	Indan. Yellow G Paste—(B)	
849	Indan. Yellow G Dbl. Pst. (s. s.)—(B)	
849	Vat Yellow G Dbl. Pst. (s. s.)—(B)	6,624
851	Alizarine Leveling Blue B—(C)	500
852	Alizarine Irisole R Powder—(By)	927
853	Anthraquinone Violet R Powder—(B)	600
854	Alizarine Viridine FF Paste—(By)	2,302
855	Alizarine Blue SKY—(By)	1,102
856	Alizarine Astrol B Powder—(By)	399
858	Alizarine Light Blue B—(S)	
858	Alizarine Light Blue B Conc.—(S)	
858	Alizarine Light Blue SE Conc.—(S)	
858	Alizarine Sapphire Blue SE—(I)	4,826
859	Alizarine Direct Blue RXO Powder—(B)	400
860	Alizarine Light Blue BGAOO—(S)	500
862	Alizarine Blue Black B Powder—(M)	
862	Alizarine Blue Black 3B Powder—(By)	4,168
865	Alizarine Cyanine Green G Ex. Pdr.—(By)	
865	Alizarine Cyanine Green 3G Pdr.—(By)	
865	Alizarine Light Green GS Conc.—(S)	2,446

(Continued on page 404)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

Vice-Presidents
WILLIAM D. LIVERMORE E. H. KILLHEFFER

Secretary
WALTER E. HADLEY
5 Mountain Avenue, Maplewood, N. J.

Treasurer
WINTHROP C. DURFEE
516 Atlantic Avenue, Boston, Mass.

Councilors
RALPH F. CULVER GEORGE A. MORAN
ARTHUR E. HIRST WILLIAM K. ROBBINS
WILLIAM R. MOORHOUSE WALTER M. SCOTT

LOCAL SECTIONS AND THEIR OFFICERS

Northern New England Section—
John F. Bannan, Chairman, M. T. Stevens & Sons Co., North Andover, Mass
A. K. Johnson, Secretary, Lowell Textile School, Lowell, Mass.

Rhode Island Section—
Walter S. Williams, Chairman, Mount Hope Finishing Co., North Dighton, Mass
Albro N. Dana, Secretary, Franklin Process Co., Providence, R. I

New York Section—
E. F. L. Lotte, Chairman, National Silk Dyeing Co., Paterson, N. J
Daniel P. Knowland, Secretary, Geigy Co., 89 Barclay Street, New York City.

Philadelphia Section—
Elmer C. Bertolet, Chairman, Philadelphia Textile School, Philadelphia, Pa.
Percival Theel, Secretary, Philadelphia Textile School, Philadelphia, Pa.

Southern Section—
Harold M. Chase, Riverside and Dan River Cotton Mills, Danville, Va.
Harry W. Ormand, Secretary, Union Bleachery, Greenville, S. C.

APRIL MEETING OF THE NORTHERN NEW ENGLAND SECTION

The April meeting of the Northern New England Section of the American Association of Textile Chemists and Colorists was held at the Twentieth Century Club, Boston, on Saturday evening, April 18, Chairman Bannon presiding.

Chairman Bannon—Gentlemen, please give us your attention for a few minutes. I want to make some announcements.

We have decided to have a joint meeting in Providence on June 26. Proper notice will be sent by the secretary so that you can make arrangements for going there. One of the attractions is that we can attend the Exposition of the Chemical Equipment Manufacturers' Association.

The council have decided that, in harmony with the ideas of the Rhode Island Section, we shall meet on Friday, June 26, at 5.30; there will be an informal dinner. A speaker will be announced in the notice. We expected to get a prominent chemical engineer, but he has to preside at a later meeting of his own association so that we are not sure that he can speak to us also; but we will get somebody worth hearing, and, in accordance with our usual ideas, when we have an important man will give him a chance to do all the talking.

The next announcement concerns the outing. You will remember last year some of the people objected to the weather we had. We had only one hour of bad storm; the rest of the day and evening was nearly perfect. That was at the Merrimac Valley Country Club. This time we are planning to go to the Vesper Country Club in Lowell. It was originally decided to have it on Thursday, but I understand that Thursday may be inconvenient for some people on account of the crowded condition of the Country Club on that day, so that we shall probably have it on Wednesday. Mr. Sampson is chairman of the Entertainment Committee and in due time you will get proper notice. For the Entertainment Committee I have appointed Mr. Sampson, Mr. Stewart, Mr. McCool, Mr. Fisher and Mr. Christensen.

When planning for this evening's meeting I talked with a number of men and they all agreed that if we could have Professor Hibbert speak on the subject of "Chemistry and Textile Fibers" it would be a treat. Many of our members had been to Philadelphia where Professor Hibbert spoke, but as I understand the rooms were rather small and a large number of our people could not hear his whole lecture. I asked Mr. Claflin, whose persuasive ways are well known, to interview Professor Hibbert. After an interview the Professor very kindly consented to come here and speak to us.

If you could have heard the discussion that went on this afternoon on the question of research, in which Professor Hibbert took the principal part, and people like Dr. Norris of the Institute of Technology, another famous educator, you would appreciate why we have such hard work in competing with foreign countries—England especially—and Germany also.

The trouble with most of our people is that if they are up against a difficult proposition they go to Congress and try to get a tariff passed to protect them. But I am

afraid, on account of our President's attitude, we can't expect any higher tariff, so that we must be able to produce better work through research.

I am very glad to be able to introduce to you Professor Harold Hibbert of Yale, who will speak to you on "Modern Chemistry and Textile Fibers."

Modern Chemistry and Textile Fibers

By Prof. Harold Hibbert

Yale University

Gentlemen—It is a great pleasure to accept the kind invitation tendered by Mr. Claflin in behalf of the Section to address you this evening, not merely because the interests you represent are some of the oldest pertaining to the textile industry in America but because it also indicates on your part a growing recognition of the importance of scientific research as the fundamental and controlling factor in its future development. The Society is indeed fortunate in having as its president one who is keenly alive to the situation, and to the profound influence the remarkable developments in cellulose chemistry are already exerting on the progress of the industry.

The subject scheduled for discussion is "Modern Chemistry and Textile Fibers," a topic selected by your committee as probably offering the widest interest to each member of the section.

In a series of talks to other branches of your society the question as to the nature of the cellulose molecule has been touched on in greater or less detail, but at the risk of some repetition it would seem advisable to again review as briefly as possible a number of the salient features.

Cellulose, whether in the form of purified cotton, or as obtained by the purification of wood pulp, esparto grass, etc., is one and the same substance, chemically speaking.

It is manufactured in plant life from the sugar present, the latter being synthesized from carbon dioxide and water as shown recently by Professor E. C. C. Baly. A large number of naturally occurring sugars are to be found in the vegetable kingdom, but the product from which cellulose undoubtedly appears to be derived is the familiar one known as glucose. The evidence for this is found in the fact that it is possible for any chemist with the necessary training to take a piece of purified cotton into the laboratory, and by relatively simple means and technique transform it back again, *quantitatively*, into glucose.

A glance at the empirical formula of the two products:

$C_6H_{12}O_6$	and	$C_6H_{10}O_5$
Glucose		Cellulose

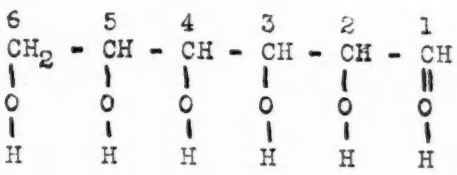
shows that cellulose differs from glucose only in that its molecule has lost the elements of a molecule of water:

$$C_6H_{12}O_6 - H_2O = C_6H_{10}O_5.$$

It may therefore be regarded as a *dehydrated* or *anhydro* glucose, and it is precisely with regard to the mode in which this molecule of water is removed that so much progress has been made within the last few years.

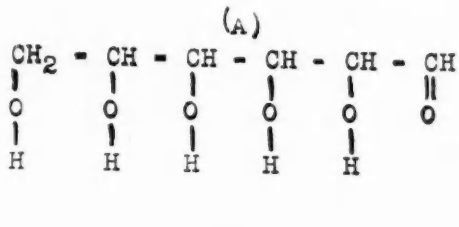
It is a well-established fact that there is no free aldehyde (CHO) group present in the cellulose molecule so that in its synthesis by the plant from glucose it is evident that this particular group disappears.

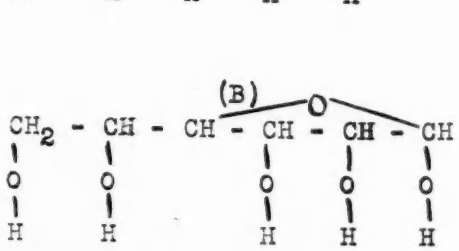
The formula for glucose may be written:



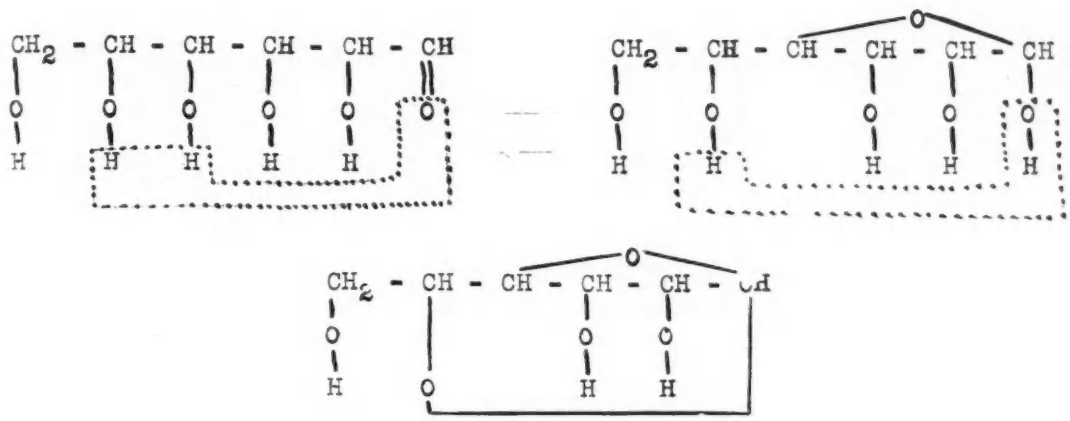
and it is apparent that water may be formed from the oxygen atom of the aldehyde group and two hydrogen atoms of the hydroxyl groups in a number of different ways.

Furthermore, it now seems very probable that glucose instead of being the simple derivative shown above, is, in reality, an equilibrium mixture of two different compounds (A) and (B):



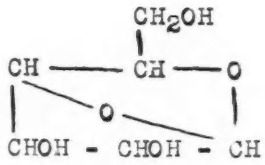


from either of which, however, the simple cellulose molecule may be formed by the loss of a molecule of water. The evidence available makes it very probable that this takes place as indicated below:



Cellulose

or, written in another form



It is of interest that this formula was first proposed by the speaker some years ago, at a time when there was little or no experimental evidence in its support, and yet to-day it is probably as much in accordance with the recent evidence as any other.

Such a formula is evidently capable of explaining a large number of facts. It contains three hydroxyl groups and consequently is capable of yielding a trinitrate (guncotton; nitrocellulose); a tri-acetate (cellulose-triacetate or Celanese), etc.

It does not contain a free aldehyde group, but its reconversion into sugar (glucose) can readily be brought about under the influence of acids; in other words, the effect of acids is to bring about the formation of free aldehyde groups.

The formation of cellulose from glucose is, however, not so simple a problem as might thus appear on the surface. Instead of the cellulose complex being a simple molecule of the above type ($C_6H_{10}O_5$), it is, in fact, a much more complex substance. It is what is scientifically known as a "polymerized or associated aggregate"; that is, a product in which a large number of the simple molecules are joined and held together in a highly complex unit by forces, the nature of which is at present unknown. Moreover, the latter vary with each type of cellulose, and in fact, in some small degree, probably with each individual cotton fiber.

It may well be asked, "How in view of this is it possible to anticipate such a far-reaching knowledge of a natural product, cotton cellulose, as will provide not only data for the intelligent conducting of routine industrial operations but also enable us to forecast the important—possibly revolutionary—change awaiting the industry?"

In the first place the problem is simplified, for in spite of the complexity of the natural cellulose aggregate, the "general characteristics" of the simple cellulose molecule (from which all the more complex forms are derived) persist in all forms of cellulose, so that on the basis of the simple formula ($C_6H_{10}O_5$), and of its structure, as indicated above, it is possible to predict the existence of very many of the properties of the more complex aggregate.

Future progress in the textile industry will undoubtedly stand in close connection with the greater or less insight which the scientist is able to obtain into the nature of the forces which bring about, not only the formation of the more highly complex cellulose aggregate, but also of thsoe responsible for its dissolution into simpler derivatives (hydrocellulose, oxy-cellulose, dextrines, sugar).

Along what lines is such progress being made and what are some of the probable results?

In the first place it has been customary to regard cellulose as an amorphous, stable colloid; that is, a complex substance devoid of crystalline structure.

Both the view of the amorphous character, and that of its stability, stand in need of some modification.

It is now possible, thanks to the fine work and technique developed under Professor Herzog at the Kaiser Wilhelm Institute, Berlin (based in turn on the work of Lane, Bragg and other scientists) to obtain from an examination of fiber structure by means of Roentgen rays, a much clearer insight into the nature of the inner structure of the cellulose aggregate. Instead of being an amorphous, colloidal substance as considered heretofore, cotton cellulose apparently consists of a semi-crystalline product—in which the crystallites are all arranged parallel to the axis, and are embedded in a magma of cellulose. This parallel arrangement appears to have an important bearing on the properties of the fiber. In viscose silk, the crystallites are arranged "higgledy-piggledy" fashion, and there is also a marked difference observable in the case of mercerization under tension and in the absence of it. In the former case the crystallites retain the same relative position as in untreated cotton, while in the latter case a pronounced change occurs.

It is possible, in this way, to show marked characteristic changes in internal structure, not only in cotton, but also in a variety of other fibers, so that the method holds promise of great future possibilities in forecasting possible industrial developments, as it enables us, for the first time, to actually gaze inside the complex, cellulose molecule.

As to the stability of the cellulose complex, it is unnecessary to remind textile chemists that this is a matter of relative terms. As a matter of fact, cotton cellulose, as a colloidal product, is influenced by a variety of mild chemical reagents. The nature of the forces which hold the "cellulose aggregate" together are still unknown, but they are affected to a remarkable degree by acids, and certain special reagents such as zinc chloride, ammoniacal cupric hydroxide, etc.; on the other hand, they are influenced to a much less degree by alkalies.

This stability toward alkali is, in fact, one of the outstanding features of the cotton fiber, and differentiates it sharply from natural silk, in which conditions are exactly reversed. It is this factor which is probably the cause of much of the present trouble in the cross-dyeing of fabrics containing natural and artificial silks, since the latter represent merely modified forms of hydrated cotton.

Instead of discussing the different types of artificial silk, with which you are doubtless now familiar, it would seem of interest to consider certain phases of cellulose chemistry and their bearing on the textile industry. If these bear more directly on cotton than on either wool or silk, the excuse must be that cellulose, either as cotton or wood pulp, is likely to exert a still more marked future influence from the point of view of new, combined fabrics, produced either mechanically, or chemically, from all three (wood pulp or cotton, wool, silk).

One of the big difficulties of the textile chemist, hitherto, has been the use of such expressions as hydrocellulose, oxycellulose, hydrated cellulose, etc., without any clear idea as to their meaning, or application, and it has been one of the first tasks of the Cellulose Division of the American Chemical Society not only to endeavor to provide a scientific elucidation of these terms, but also to encourage fundamental, scientific work relating both to their analytical recognition and estimation.

As a result of scientific work carried out here and abroad (principally in Europe), it now seems quite clear that *hydrocellulose* is to be regarded as a degradation product of cellulose, resultant on the action of acids. It represents a mixture of unchanged cellulose with certain degradation products (cellulose dextrine). The forces holding the complex cellulose aggregate together have been broken down to give less stable derivatives—simpler molecules—(dextrines) accompanied at the same time by a partial step toward sugar formation, in that, free aldehyde groups have been formed by the addition of water to the molecule. *There has not taken place any oxidation of the molecule.*

On the other hand, "*Oxycellulose*" is an oxidation product of cellulose. In general, it is more than this, it is a combined oxidation and degradation product.

It consists, as formed in most industrial operations, of a product representing principally unchanged cellulose but containing a small amount of oxidized cellulose, with probably some modified (depolymerized) cellulose. The presence of even a small amount of such products is capable of exerting a profound influence on the cellulosic fabric.

"*Cellulose hydrate,*" *or hydrated cellulose*, may be defined, according to Schwalbe, as "swollen cellulose," in that it merely represents a swelling of the fiber, accompanied by absorption of water, as a result of which the crystallites are moved farther apart and the fiber surface made more reactive.

A short discussion of each of these products may be of interest. The nature of *hydrocellulose* is of some importance to the woolen industry from the point of view of "wool-recovery" from "shoddy," and an accurate knowledge of its properties may possibly lead to new methods of treatment in which not only the wool is recovered, but by means of which the hydrocellulose degradation product is also utilizable.

Cotton cellulose is remarkably stable toward dilute acids, but when the concentration is allowed to increase, as by the simple process of evaporation in the "carbonization process," a degradation of the "cellulose aggregate" occurs to less complex derivatives of the dextrine type; that is, to derivatives in which the forces holding the large cellulose molecule together have been broken down and aldehyde-containing products formed.

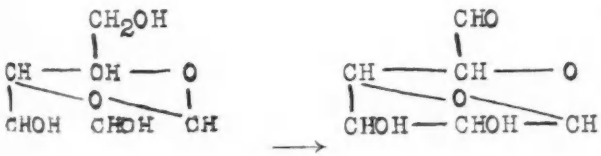
With regard to *oxycellulose* the experiments carried out both in Europe and at Yale University indicate that oxidation in *alkaline* solution is much more destructive to the fiber than when carried out in an *acid* medium.

As a result of an interesting research recently carried out by Messrs. Birtwell, Clibbens and Ridge, of the Shirley Institute, Manchester, England (and which is of considerable value to all chemists engaged in the bleaching of textiles) it is shown that the nature of the oxycellulose formed in bleaching varies very markedly with the acid or alkaline character of the bleaching liquor. A small difference on either side of the neutral point exerts a remarkable difference on the character of the oxycellulose formed, giving rise, in fact, to two quite different types of product.

The one formed on the alkaline side of the neutral point has a high methylene-blue absorption and a low copper number; that on the acid side is characterized by a low dye absorption, and a high copper number. The latter is also characterized by excessive loss of weight in scouring, although the cotton left after this treatment is found to have regained its original chemical properties. This is not true of the former. As a result of the investigation "the copper number is recommended as a useful criterion of the permanence of white in bleached cotton; the methylene-blue absorption as an indication of level-dyeing properties." It is also found (and these results have been confirmed at Yale University) that the viscosity of an oxycellulose solution of either type in ammoniacal cupric hydroxide solution is very much less than that of the untreated cotton, so that the Shirley Institute investigators propose to use "viscosity as a means of detecting tendering in a normal process of scouring and bleaching."

The question as to the structural changes involved in oxycellulose formation is of great importance to the industry, and considerable further scientific investigation will be necessary before a clear insight into their character can be obtained.

It is not possible with our present knowledge to state more than that the first change is in all probability an oxidation of the primary alcohol to an aldehyde group:



The next stage, whether carried out in acid or alkaline medium is a matter of uncertainty. It may, and possibly does, consist not only in the oxidation of the aldehyde group to an acid, but at the same time this is accompanied by degradation and hydrolysis (aldehyde formation) the nature of which is at present under investigation. It is only through the information acquired from a series of carefully planned, scientific investigations that the necessary knowledge can be acquired whereby conditions are determined under which the cellulose aggregate remains unchanged and yet at the same time the coloring matters and impurities are oxidized—rendered soluble—and thus capable of removal.

With regard to *cellulose hydrate,* under this term must be included Viscose, Chardonnet and Cuprammonium silk and mercerized cotton. There is a very close relationship—at least chemically—between all forms, so that it is only natural to expect some remarkable developments from the mass of fundamental, scientific research work at present being carried out on the nature of hydrated cellulose.

In conclusion the results so far obtained, both at the Shirley Institute, England, and the Kaiser Wilhelm Institute, Germany, are already proving of considerable value to the industry, and there would seem to be no doubt but that the future control and profits of the textile indusry will undoubtedly lie with those foresighted enough to appreciate the value of, and to give the necessary financial support to, fundamental scientific and technical research.

Discussion

Chairman Bannan—Gentlemen, there is no doubt that many of you will have some questions to ask Professor Hibbert. This afternoon he answered many of our questions. I think he will be fully as willing to answer yours to-night. The subject is open for discussion. I hope you will start in at once because I want time for Professor Olney to give us some of his excellent ideas on how to extract money from manufacturers in further research work.

Professor Olney—I would like to ask Professor Hibbert one question. He speaks of the change in viscosity of oxidized cellulose dissolved in cupramonium solution. I would like to ask him if he can tell us to what extent the hydrocelluiose or degraded cellulose dissolved in cuprammonium would change the viscosity.

Professor Hibbert—I have no figures, but I feel sure the viscosity would be very much lower.

Professor Olney—I was wondering whether there would be enough difference so that you could use this as a method for telling one from the other.

Professor Hibbert—You should be able to readily distinguish between cotton and hydrocellulose, but as between hydrocellulose and oxycellose, that is largely a question of their manufacture.

Professor Olney—Then in the carbonization process where we treat woolen goods containing burs and other things of a similar nature to destroy the vegetable matter, we used to think that we got oxycellulose there. But more recently I think we have come to believe that it is hydrocellulose.

Professor Hibbert—Yes; hydrocellulose. A degraded cellulose entirely.

Professor Olney—Is there a definite compound formed, would you say, or is it a mixture?

Professor Hibbert—A mixture of different compounds.

Professor Olney—The old theory, you know, was that sulphuric acid was a very strong dehydrating agent and took away the oxygen and hydrogen and left carbon behind, and that is where they derived that term "carbonizing process." I think that theory has been exploded long since.

We used to say when we took a white pine board and let a drop of concentrated sulphuric acid run down it and got a black streak, that the black was the carbon that was left behind after all the hydrogen and oxygen water, in other words, was taken out. Apparently something else takes place there.

Professor Hibbert—A simple explanation is that there would be present a little sugar and the presence of sulphuric acid causes the whole thing to swell up and produce carbon. The same thing happens here; it goes to dextrine and then to sugar, and the charring is the effect of the sugar.

Professor Olney—Don't you get that to some extent in the carbonizing process?

Professor Hibbert—Yes; you do.

Professor Olney—Would it not be all right to say that in carbonizing you get a series of reactions which vary all the way from a slight change to even that of deposition of carbon?

Professor Hibbert—It would be correct in many cases.

Mr. Christensen—I would like to ask Professor Hibbert a little more about this cuprammonium solution differentiating between the different effects that would be produced by an alkaline solution, also in an acid solution, also hydrocellulose. Does the cuprammonium solution differentiate between the cotton damaged in the alkaline solution and that damaged in an acid solution?

Professor Hibbert—No. You have to use three factors. You must use your Methylene Blue in comparison with the original cotton; you must determine the copper member in regard to the original cotton, and then the viscosity. If you have a low copper member but high Methylene Blue absorption you can trace it back to over oxidation in alkaline medium; if you have a low absorption of Methylene Blue, relatively, and a high copper member, you can trace that back to overoxidation in an acid solution. A low viscosity in cuprammonium solution is an indication of tendering in *both* cases.

Mr. Walter Durfee—Relative to that question of carbonizing, I think it might be interesting to mention that if the temperatures can be regulated you can get a very perfect carbonizing without any degradation.

You can get good results with 70 per cent sulphuric acid by proper regulation drying.

Mr. Christensen—I wish to state in that respect that you get very little loss in weight in wool, but with the method of using 70 per cent sulphuric acid that we always obtain from 5 to 8 per cent loss in wool substances, which is considerably greater than you would get in the ordinary carbonizing process where you concentrate your acid so that the vegetable matter is destroyed.

Professor Hibbert—May I add at this stage that the question arose this afternoon as to whether the woolen industry had any problems. Regarding this question of wool treatment I think undoubtedly through research we could recover both the cotton and the wool. We know considerably more than we did a few years ago, but we are using identically the same processes we did thirty or forty years ago. Why destroy the cotton? Why not concentrate on recovering both?

Mr. Fisher—There is only very little cotton in there.

Professor Hibbert—It figures out to pounds if you add it up.

Chairman Bannan—Most of the carbonizing is done in the woolen industry on account of the burs. Those who are old enough to remember the good old red flannel underwear days will remember that the first thing you did was to take tweezers and pick out the burs from your suit. Now we carbonize them out.

Professor Olney—I think that Professor Hibbert has in mind the carbonization of rags in the manufacture of reclaimed wool. In this case there is often 50 per cent more of cotton.

Mr. Spurr—It would be interesting if you could separate them and not destroy any of them, because you take a lot of old suits and all the linings have to be practically eaten up with the acid, and there is a big loss there.

Professor Olney—I think that would be largely a matter of cost, figuring out whether it would cost more to reclaim the cotton in that way; but at the present prices of cotton there may be something in it.

Mr. Spurr—I am interested in dyeing silk fibers for underwear, and such as that, made from some of the artificial silk. One of the difficulties we ran across first was getting the dyeing right. We washed under ordinary conditions at 120, using a slightly alkaline soap solution. We had difficulty with this, especially in the light blues, and in the dark browns. The first solution would show one thread was heavier than the other. We proved it was not so; they were just exactly the same. We had to increase the scouring process. We are at the present

time using about 10 per cent of olive oil soap and 3 or 4 per cent of phosphate of soda, and then scouring around 180, which at first they claimed would ruin the artificial silk. Instead of that we feel sure we have a better luster after it has been scoured at that temperature than before, and still a better feel; a more silk-like feel.

Professor Hibber—How about the strength?

Mr. Spurr—It does not injure the strength at all. We tried that. The scouring is being done at 180 and giving perfect shades. We are getting very light flesh colors, and all those. We have got away from our trouble by increasing the temperature of the scouring and by using the phosphate of soda. If we reduced the olive oil soap and increased the alkalinity we would probably injure the silk—there is no doubt about it at all.

Professor Hibbert—That is what we are trying to do now in regard to bleaching. My financial support has come from the paper and pulp industry rather than the textile. It should be possible to develop buffer solutions, so that in bleaching by adding in the right indicator, and, knowing the alkalinity was all right, the desired result would be obtained. You can buffer up to a certain point and then you can heat to a higher temperature.

Mr. Spurr—And in bleaching, while I have tried both the peroxides, both the sodium and the other peroxide, I find by bleaching with hypochlorites we get a much nicer bleach and a milder bleach, and it leaves the silk in better condition than with the peroxides.

Professor Hibbert—What do you use in the bath?

Mr. Spurr—The hypochlorites—the ordinary chloride of lime and carbonate of soda. We make the bleach in that way. By doing it in that way and by dyeing down to what we might call the pastel shades, we can get them perfectly even.

Chairman Bannan—Now will you kindly tell us, Professor Olney, something about what you have in mind concerning the encouragement of research work.

Co-operative Textile Research

By Prof. L. A. Olney

I think you men have heard so many times what I have to say about encouraging research work that it will be nothing new, but Mr. Bannan apparently wants me to say something about it again, so I will.

I have in mind that textile research in this country should be developed through perhaps two different avenues. In the first place, I am a firm believer that textile research, taken as a whole, should be consolidated under one general supervising body, and that the function of that supervision should involve the collection of funds for the purpose of research and the appropriation of those funds and designation as to where they should go.

Now, that, of course, is assuming that the whole textile industry is interested, and that each individual interested in some way, either voluntarily or involuntarily, is contributing his share toward that work. That may appear to be far-distant; and yet, on the other hand, I am inclined to believe it is not as far away as we might think. I am certain that the textile industry in this country sooner or later is going to wake up to the fact that they must do something more specific and more definite along this line if they are going to maintain their suppremacy. Perhaps I had better not say "supremacy," because I am afraid they have lost that already in some respects.

The Americaan textile industry has been too willing to follow and not willing enough to attempt to take the lead. I think that has been characteristic of the textile industry in this country from the very beginning. I may be mistaken, and I hope I am, and if I am I shall be glad to have anyone correct me, providing he can produce the facts to show that I am wrong.

Now, the other avenue of developing research work is through individual units, as you might say, which would come more or less under the direct supervision of and supported financially by this fundamental body, which might be perhaps fittingly designated as a "Foundation for Textile Research." I think the two are quite separate in a way, and yet they have their definite function.

The man or the group of men who are directly engaged in research work have not the time, and should not take the time, to go out and raise the money to carry on their work, because if they do they immediately cut the efficiency of their work down greatly and are going to use up a lot of time that they might spend more profitably in their laboratories.

Now, these individual units I refer to might include some of the educational institutions of the country, and particularly the textile schools and technical schools that are best equipped and qualified for carrying on such work, and then such agencies as the Bureau of Standards, and, last but not least, the American Association of Textile Chemists and Colorists. I believe that in our Association we have a unit which, both as a directing and a working body, could perhaps accomplish as much as, if not more than, most other agencies.

Now as to the first avenue. That is a broad and a very extensive one, which can never be successfully put through unless we have behind it the textile manufacturers of the country; and the problem, or at least one of the problems, is to engage their interest and demonstrate to them that it is absolutely essential that such research work should be developed in order to maintain the industry.

As to the second, the individual working agencies,

I think for the moment we need not concern ourselves with any except our own Association, and while we are waiting for the materialization of the first we hope to develop our research work by securing funds in two different ways. The first way is through the securing of corporation memberships. We have made very little effort so far to do that, but we find that where we have made the effort we have met with very good response indeed. In the second place, through what we may ourselves, as individual members, be able to do.

Now, if you have not already done so you will soon receive a questionnaire that is being sent out in order to get data for the 1925 year book, and the very last item on that questionnaire is in regard to securing funds from the members to help along research work.

Briefly stated, it is simply this: Our dues are $5 a year, which is ridiculously low when we compare it with almost every other association of the kind. The American Chemical Society is $15; the Institute of Chemical Engineers is more than that; the English associations along this same line, two or three times as much as we are paying. Now, there are many members who perhaps are not able to pay more than $5—particularly the junior members. There are other members who are able to pay far more than that, and we are hoping that they will conscientiously read that last item of the questionnaire and put down a figure there which will represent what they can afford to give to develop research work through our own Association.

Our Association, of course, amounts to little unless we can benefit the textile industry, particularly as concerns the development of textile chemistry and textile coloring. And one way we can help it is by contributing what we can ourselves toward our own Association work I told one man that we hoped to secure $5,000 the first year toward research work. He thought we were making a great mistake not to go out for $10,000. Now, he was far more hopeful than I am. And yet if we can secure the proper interest, we have no idea how rapidly our support will grow, and it is largely a case of getting it started.

We have eight hundred members, and just figure out what an average contribution of $5 or $10 would make! If you take $10, that would be $8,000 right there. Of course, we can't hope for that, but we are hoping that some members will give $100 toward it. In fact, the questionnaire says that certain members have already offered to give $100 the first year if at least ten others will do the same thing. Now, there is something to think about right there.

Now as to what we are going to do if we get the money. That is the question that is immediately asked. We have our research committee. They are all busy men; they have not the time to settle right down to doing laboratory work. Neither do they feel that they can take the employees that work in their laboratories and devote their time to work of this type.

One thing we propose to do is to secure as many and as high-grade workers as we can, depending on the amount of money that comes in, and we will have some of them work in different laboratories, perhaps. The work will, of course, be centralized to a considerable extent, but if any one particular man—a member of our Research Committee, for instance; or anyone else, so far as that is concerned—can convince us that he has got a problem that is worth while, we might send one of these men right to his laboratory to work under his supervision for one month or two months, or an indefinite length of time, until that problem is gone into and it is decided whether it is worth while to continue it any longer.

There are plenty of problems to work on and there are plenty of ways in which we can use any sum of money that is collected or contributed for that purpose. In some cases it would be very desirable to give grants of $100 or $200, or perhaps more, to men who have some specific problem to work upon and yet require funds to carry along that work. I do not think there is any doubt but what we can make good use of as much money as we can get, but the first thing, of course, is to get it.

My appeal—if you would call it that—is that you will use your influence, as far as you can, and also your knowledge of the whole subject, in talking with the various men in the industry in order to get them interested. I think if you could have heard the talks that we had this afternoon from Professor Hibbert and Dr. Norris of the Institute of Technology, who, as you know, is President of the American Chemical Society, and also connected with the research foundation, that you would say that there is a positive problem, and one which the textile manufacturers themselves should know about, and if they once see that in the true light I have no doubt but what money will come for research work.

Now, in closing what I have to say I want to caution you against confusing these two propositions I have spoken of. The second is our own personal affair. It is something we can go ahead with regardless of whether there is any textile research foundation created or not. It is something that is wholly within ourselves to carry out and do. But, on the other hand, we hope the time will come when there will be this larger and broader body that may finance the work of this Association as well as other research units, so that there will be no necessity of our having to collect

funds in any way, either from our members or through corporate memberships.

Discussion

Mr. Griffin—Mr. Chairman, I want to say that I have heard Professor Olney on two different occasions, and I want to say to you gentlemen that you want to pay very careful attention to what he says when you listen to him, because I am very well aware that he is in the advance and what he says is no dream, in my judgment.

Now, regarding this matter of extension of the work. As you know, I am rather a newcomer into this industry, and I may be wrong in some of the things that I have in mind. I believe that the industry, the manufacturers, really ought to take hold and put money into it. I do not believe they are going to do it this year, and I do not know that they are going to do it next year, but they ought to pay attention to what Professor Olney has said, because it means more to them than it does to us, because we are not so tied down that we can't go out and get another job, but they are pretty badly tied up where they have their money invested.

I have a very strong feeling that when it came to the matter of anything like a foundation in which funds were to be secured from the textile industry, that they would not be forthcoming very promptly. I have a feeling that they would feel that they were really increasing their competition, that they were adding to their competition among themselves as well as competition from abroad.

So far as the Association itself is concerned, while we are very much interested in the industry—we are drawing our salaries from the industry—at the same time there is not any reason why the industry should not pay us and should not support us in our best endeavors to help the industry.

Now, I know the history of the paper industry. I know very well that the paper industry, the paper manufacturers, has contributed very largely along certain lines to the technical association. There was $50,000 contributed in the United States for the publication of the five volumes on chemistry of paper making. That is now a fact, and those works are used by the University of Wisconsin; they are used by the extension system in the State of Massachusetts. And they are not stopping there. The technical men in the pulp and paper industry are much more highly regarded than they formerly were. Dr. Arthur D. Little and I were among the first paper mill chemists, and it is surprising to me, and to us, to see the extent of the growth of the technical association. In the brief time that I have been here, this Association has been organized, and I have no doubt that it has great possibilities before it. But I am for the technical man, first, last and always. Of course, I understand that we are dependent upon the manufacturers, but I do not feel like making a contribution to them. I feel that they should make a contribution to us.

I must say that if I were Professor Olney I should go out for a very much larger sum of money. I think the problem is worth it. I think that it would receive a very much better response if he went out and asked for five to ten times as much, because I am very well aware, and you men know it who know anything about new machinery, that a few thousand dollars you do not see at all—I mean, it is so small that it doesn't get you anywhere. Now, I do not believe that a great deal of progress can be made in the ordinary chemist's laboratory. At any rate, we would be confronted with the feeling and the statement from manufacturers that "it is all right; you can do it in the laboratory; but can you do it on a mill scale?" and you are obliged to say that you have not done it on a mill scale. The thing has got to be done on some considerable scale. And if you go through your technical laboratories; if you even go through Arthur Little's laboratory, or visit Professor Hibbert at Yale, you will find very excellent equipment for the determination of these problems. And I do not see any way, on any small sum of money, to make any particular progress.

Now, I want to suggest this, which is the experience of the technical men in the pulp and paper industry: That, rather than to have a committee on research, which is broad and might include everything that we do not know, if we were to divide that work up and specify a certain particular problem to a certain committee, I think we would get better results. In the Association of Agricultural Chemists there are reporters on various subjects, like potash only, and like nitrogen only. If we were to appoint certain committees to make certain particular investigations, I really think that we would have something more specific to talk to and to work to, and I have a feeling that we would get farther that way.

Professor Olney—Mr. Chairman, in respect to what Mr. Griffin has said, I would like to just bring to his attention one or two things.

In the first place, our Research Committee is more or less of an executive committee, and that is divided up into such committees that he speaks of. We have at least six different committees already. And the chairmen of these committees as a rule are members of our Research Committee, but they include in their committees — that is, these subcommittees — many members who are not connected with the Research Committee. So that I think we are doing exactly

what he suggests, only perhaps in a slightly different way from what he has in mind; and as this work develops the Association might readily create as many committees as are necessary to carry on such work.

He also speaks of the possibilities of carrying out work on a large scale. Now, modesty, perhaps, prevented me in the first place from mentioning this fact, but we have at the Lowell Textile School an equipment which probably could not be replaced to-day for a million dollars, and we have almost every faciilty there for full-scale textile work. In fact, I presume when it comes to the mechanical side we have a more complete or more diversified equipment than they have anywhere else in the country. We have a greater variety of looms, for instance, than you can find in any one mill in the country, because we have the looms that would be used in every variety of mill. And that is more or less true of our whole equipment all the way through. Of course, the Lowell Textile School would be open absolutely to the work of our Association, and we have the advantage of that large, expensive equipment and could get the use of it for practically nothing, which I believe gives, in a way, our Research Committee an advantage that many other groups would not have at all.

Speaking of the sum of money: expressing it in round figures, I should say that this fundamental committee or foundation of textile research, should raise $500 000 a year to carry on this work properly, and I might say that that would only be about one dollar on every $5,000 worth of sales made by the textile industry.

Mr. Griffin—I would like to ask Professor Olney—this is purely for information—how much does the State of Massachusetts furnish to the support and building up of the Lowell Textile School?

Professor Olney—At the present time absolutely every cent.

Mr. Griffin—Now I would like to ask Professor Olney what general attitude the industry, the individuals among the manufacturers, really show toward the school; whether or not they are responsive to it; whether they appeal to you for your graduates, and how far they come to you and depend on you?

Professor Olney—Why, they support us in many ways. As I was telling one of the men to-day, we have about twelve men to graduate—ten men, say—this June, and I think that we already have applications for about thirteen or fourteen men out of that class. Now, someone is going to get left. Then, of course, we have all grades of men coming along.

Mr. Griffin—Did you speak of the textile chemists?

Professor Olney—I referred to the graduates of the Textile Chemistry and Dyeing Department, and not to the Manufacturing Department. In this connection I might say that we have calls from both the dyestuff and textile industries, and the dyestuff men seem to take a very large proportion of our graduates. Fundamentally, of course, the textile school is developing textile chemists and colorists, but dye distribution is, of course, a very necessary and important adjunct to the textile business. So perhaps it is just as well that a goodly proportion of our men go into that end, if that is where the great demand is. But I suspect, and perhaps am afraid, that the dyestuff end offers a more attractive position at the start, and I think in many instances our graduates would do better if at first, for three or four years, they would go directly into the dyehouse and the color application end. They would be worth more to the dye distributers if they did that. But they really in many instances go directly from graduation to the dye distributing part of the industry. Of course, it is one of those things that naturally takes care of itself. We wish to satisfy the greatest demand, and if the dye distributing industry appreciates the graduates of the Lowell Textile School more than the textile manufacturers, and for that reason is willing to pay them higher salaries, we can't blame the graduates for accepting those positions rather than going directly into the industry. That is one of the problems that, as head of the chemistry department, dyeing department of the Lowell Textile School, I have to deal with each year about this time, talking with these men and trying to locate them where I believe they will be of the greatest use. There are certain men who are best fitted for the application end, and I always recommend by all means that they go directly into the mill. There are other men that I know would not make a success in the mill and yet I believe they would make the most excellent salesmen, and I endeavor to get them located with the dystuff concerns.

Mr. Griffin—I am glad to hear that the students are in demand. That gives an opportunity to ask something of the manufacturers who want the men.

Now, I am just as fond of the profession of chemistry, I think, as anybody here, but I was given a little good advice some years ago and I have made some money out of it. I want to say to every man here, and every young man, particularly to any students that are here: Don't let an opportunity pass to make yourself valuable and to exact, as far as possible, compensation commensurate with what you believe your services are worth, because if you do not respect yourself, nobody else will.

Professor Olney—I think we all owe a vote of thanks to Professor Hibbert for coming up from New Haven for to-night, and this afternoon as well, and, Mr. Chairman, I would put it as a motion—that we extend a rising vote of thanks to Professor Hibbert.

. . . The motion was duly seconded and unanimously carried by a rising vote, after which the meeting adjourned.

MAY MEETING OF THE RHODE ISLAND SECTION

The May meeting of the Rhode Island Section of the American Association of Textile Chemists and Colorists was held in the rooms of the Providence Engineering Society, Providence, on Friday evening, May 22.

The meeting was called to order by Chairman Williams at 8.15 P. M.

The minutes of the April meeting were read and approved, and as there was no further business to be transacted, the speaker of the evening was then introduced.

The speaker was Dr. Walter M. Scott, chief chemist of Cheney Brothers, South Manchester, Conn. Dr. Scott is a graduate of Yale University, class of 1912, and he received his doctor's degree in 1915.

The subject of his speech was "The Silk Industry—Past, Present and Future." The subject proved to be a very interesting one and was followed by a display of some of the very beautiful fabrics manufactured by Cheney Brothers. His paper is published in full herewith.

At the conclusion of Dr. Scott's address a rising vote of thanks and appreciation was rendered.

Sixty-three members were present.

The meeting adjourned at 9.40 P. M.

Respectfully submitted,

A. N. DANA, Secretary.

The Silk Industry—Past, Present and Future

By WALTER M. SCOTT

Chinese myths record the culture of silk as early as 2640 B. C. In the year 500 B. C. Confucius wrote that the Emperor kept a government nursery for mulberry trees and silk worms. The Empress personally supervised the undertaking, and the gathering of the leaves for the silk worms was considered so important that it gradually became a religious ceremonial.

The use of silk in Europe was first reported in 400 B. C., at which time the Romans bought the silk from the Persians, who, in turn, had brought it from China via northern India. In 289 A. D. the culture of silk was introduced into Japan, and a few years later spread into India, and thence to Persia. About 250 years later Justinian persuaded two monks to bring a supply of eggs and start the culture in Greece. In medieval European history we learn that the sericulture commenced in Europe in 1146 as a result of the Venetian conquests in Greece. It was considered a noble occupation, as families of high rank were engaged in its pursuit.

In France the weaving of silk started in Lyons and Tours about 1200. Sericulture was not established until the reign of Henry IV of Navarre in 1600. Silk was not woven in England until 1250, and the industry was not developed extensively until 1585, when Flemish weavers emigrated to England. Sericulture was attempted under James I, but was not successful owing to the cold and damp climate. The introduction of the Jacquard loom in 1801 added greatly to the beauty of the silk fabrics which were woven by machine.

American sericulture was started in Virginia in 1620 through the efforts of James I. It was never extensive because the growing of tobacco was more profitable. It was first started in New England by Governor Leete in Connecticut in 1683, and from 1762 to 1844 Mansfield, Conn., was quite a silk-growing center. The three Cheney brothers established a silk nursery in South Manchester in 1833, and one in Burlington, N. J., in 1836, followed a little later by one near Cincinnati, Ohio.

Through speculation in Chinese mulberry trees, the price rose from $4 per hundred trees in 1834 to $500 per hundred trees in 1839. In 1840 there came a crash owing to hard times and the realization that the United States could not compete with the Orient in raising silk. After that the trees could hardly be given away, and in 1844 a blight finished what the crash had commenced.

Silk was not woven in America except crudely in homes until 1810 when Rodney and Horatio Hanks started a silk mill in Mansfield, Conn. This was abandoned in 1828. Ralph, Ward and Frank Cheney formed the Mt. Nebo Silk Mills in 1838 with a capital stock of $50,000. At that time raw silk was brought by clipper ships from China to New England in ninety to one hundred days. It now comes from Yokohama to South Manchester in about twenty days.

The first silk manufactured in the Cheney plant was for sewing purposes and was sent to New Hampshire by teams to be dyed. The Mt. Nebo Silk Mills became the Cheney Brothers Silk Manufacturing Company in 1854, and was finally shortened to Cheney Brothers in 1873. The spinning of waste silk was commenced in 1855, and in 1861 was started the manufacture of ribbons, followed five years later by the manufacture of dress goods and in 1880 came the manufacture of plush and velvets. In 1882 the Grant reel was invented, which was of tremendous value to the silk manufacturing industry, as well as the textile industry in general.

The value of silk manufactured in the United States was $6,600,000 in 1860. This had increased to $583,000,000 in 1921. In Europe the raw silk production in 1923 was 8,841,000 pounds, of which Italy produced 8,234,000 pounds, Japan produced 41,541,000 pounds and China 15,678,000 pounds. The raw silk consumption in 1913 was 57,860,000 pounds in the entire world. Of this, the United States consumed 23,540,000 pounds, France 9,680,000 pounds and Germany 7,920,000 pounds. In 1923 the United States consumed 47,740,000 pounds of raw silp. Few people realize the dominance of the United States in the silk industry.

The fluctuations in raw silk prices give the manufac-

turer a great problem. Before the war the price varied from $1.50 to $6 a pound. In 1919 and 1920 the price rose as high as $17 a pound. At present it is worth about $8 a pound.

One pound of raw silk requires 2,500 to 3,000 cocoons, each cocoon containing an average of 600 yards of silk, and it requires about 1,000 miles of single silk filament to weigh one pound. Usually six or seven cocoons are reeled together, but even with all possible economies in the growth and reeling of the cocoons, there is an immense amount of careful and painstaking hand labor involved. This naturally confines the industry to countries where laborers are plentiful and wages are low.

Some people have expressed the opinion that artificial silk, or rayon as it is now called, will eventually supplant natural silk to a large extent. However, there is actually no present indication that such is the case. It is true that the production of rayon in the United States has increased from 4,000,000 pounds in 1915 to approximately 33,000,000 pounds in 1923, but this has not been accompanied by any apparent falling off in the consumption of silk. In fact, quite the contrary.

The truth of the matter is that these two fibers are being used more and more in conjunction with each other, thereby making possible the production of many novel artistic effects. In this way, the introduction of rayon has actually stimulated the demand for natural silk and will probably continue to do so for some time to come.

. . . At the close of his talk, Dr. Scott exhibited a number of decorative fabrics manufactured by Cheney Brothers in order to illustrate the beautiful effects which can be produced both on all silk goods and on mixtures of silk with cotton and rayon. Particular attention was called to the fact that with the developments in the modern Jacquard loom it is possible not only to imitate almost exactly some of the priceless hand-woven tapestries of the middle ages, but even to improve on them in many respects.

SUMMER MEETING OF THE SOUTHERN SECTION

The Southern Section of the American Association of Textile Chemists and Colorists will hold its summer meeting at the George Vanderbilt Hotel, in Asheville, N. C., on Saturday, July 18.

Joseph H. Zens, general manager of the United Hosiery Mills Corporation, Chattanooga, Tenn., will present a paper on "Multi-Colored Effects on Hosiery"; Malcolm Mackenzie, of the Cramerton Mills, Inc., Cramerton, N. C., will present a paper on "The Reduction of Vat Colors, Including Indigo."

Non-members interested in these subjects will be welcome at this meeting.

NOTICE OF SUMMER OUTING OF THE NORTHERN NEW ENGLAND SECTION

The summer outing of the Northern New England Section has been planned for Monday, July 13, at the Vesper Country Club, Tyngsboro, Mass. Other details will be announced shortly.

Please reserve the date.

For the Committee,
A. K. Johnson.

Applicants for Membership

Active Membership

Baude, Felix, research chemist and demonstrator, Palatine Aniline & Chemical Company, Poughkeepsie, N. Y. Sponsors: B. Stokham and W. E. Hadley.

Constable, Henry B., demonstrator, E. I. du Pont de Nemours & Co., Charlotte, N. C. Sponsors: M. Mackenzie and P. L. Sullivan.

Purdy, James H., general manager, Southern Worsted Corporation, Greenville, S. C. Sponsors: B. Kendall Archer and H. E. Tillson.

Junior Membership

Jacoby, Evans E., student, Philadelphia Textile School, Philadelphia, Pa. Sponsors: P. Theel and E. C. Bertolet.

Stuart, W. Kenneth, assistant colorist, Firth Carpet Company, Firthcliffe, N. Y. Sponsors: J. H. Culver and W. E. Hadley.

Change of Addresses

Baldwin, Harold W., 1016 Crest Avenue, Beachmont, Mass.

Mackenzie, Kenneth, 614 Lamar Avenue, Charlotte, N. C.

Stott, Charles H., 215 Rochambeau Avenue, Providence, R. I.

Wang, C., 234 Linden Avenue, Ithaca, N. Y.

Resigned

Foss, Wilfred C., Greenville, N. H.

Obituary

Purnell, William, 36 Burton Street, Bristol, R. I.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

CLAYTON HOAGLAND
Managing Editor

Published biweekly by
HOWES PUBLISHING CO., INC
90 William Street, New York City

A. P. HOWES, *President* E. S. PREDMORE, *Secretary*

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00

Vol. XIV June 15, 1925 No. 10

SMASHING A TRADE EVIL

ONE of the most harmful and discouraging brands of competition which the American dyestuff industry has to combat is the distribution of what are termed "bootleg" colors. These colors are purchased abroad, presumably through sources receiving reparation dyes, and in most instances at a price far below the actual home market value in Germany. Many patented colors are imported into this country and offered in the trade at cut prices, in competition with identical products sold under American patent rights by American firms. The bootlegger holds no license to import these colors; he violates the United States patent laws to the same extent as though he made those dyes here. Although he may pay regular duty on his importations, he can in every case successfully undersell the legitimate distributor because he purchases his products at a figure far below their actual market value and pays no royalty.

The Grasselli Dyestuff Corporation, in announcing that it intends to prosecute this patent infringement, reveals to what length a company will go to uphold sound commercial principles and protect its legal rights. Its move against this pernicious trade evil should receive the hearty applause of the industry as a whole. The peculiar situation is that only a licensee or owner of these dyestuff patents is in a position to legally combat the offenders.

As the purchasers of the patented colors are involved, it is the extreme delicacy of the matter which has undoubtedly acted as a check upon any move to squelch the practice. Only when sufficient evidence against some definitely known infringer is obtainable can one openly and fearlessly institute legal proceedings. But patent laws are for the protection of industry; one who violates them is an enemy to industry, deserving of the strongest punitive measures which can be brought to bear against him. Any action for this purpose, sponsored by those who have trade rights at stake and backed by law and evidence, ought to be effective. Let us hope that this latest step presages the breaking up of such a despicable trade practice.

THE NEW CHEMICAL ADVISORY COMMITTEE

THE formation of a Chemical Advisory Committee to work with the Chemical Division of the United States Department of Commerce marks the placing of another stone in the structure of the American chemical industry. For our industry has not yet passed the formative stage; it has not yet attained that state of security which comes of age and experience, and which is reflected in an attitude of unshaken confidence in the future. Its framework still shows above the structure we have erected, and the men who are building and dreaming of the finished work still exhibit a spirit young enough to enter with enthusiasm into any new plan for strengthening the industry, such as this plan of forming a Chemical Advisory Committee.

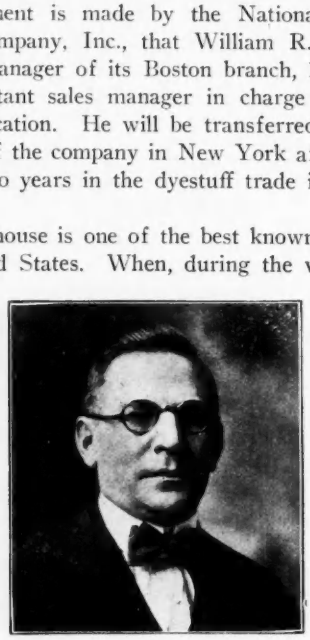
The nine men on the committee, prominent in as many different branches of the industry, have been formed into a body with a definite title, for the more or less definite purpose of co-operating actively with a very important department of our Government. Before the committee was formed the Chemical Division felt certain that the influential men in the industry could always be depended upon to aid in its work; what was lacking was an actual link, an official body, connecting the Division with the industry, and this the new Advisory Committee has undertaken to be. Both the Chemical Division and the Committee deserve the commendation of the industry, the one for having effected the formation of such a body and the other for having so whole-heartedly accepted its responsibilities.

It is pertinent to inquire if our chemical industry fully realizes that the Chemical Division of the Department of Commerce is not a private corporation, working for its own financial and industrial interests. While the new Advisory Committee was formed to increase the efficacy of the Chemical Division, it is the industry that is benefited by the work of the Division. The Chemical Division, by its intensive and extensive operations, is directly serving the industry in ways and by means too numerous to detail in this space. That is the function of the Division in the operation of the Department of Commerce. Now that the industry has accepted an active part in this work, it is probable that the Chemical Division will be more widely recognized as a Federal unit of vital importance to the American chemical industry. Only through such recognition can its work be one hundred per cent effective.

MOORHOUSE BECOMES ASSISTANT SALES MANAGER OF NATIONAL

Announcement is made by the National Aniline & Chemical Company, Inc., that William R. Moorhouse, heretofore manager of its Boston branch, has been appointed assistant sales manager in charge of problems of dye application. He will be transferred to the general offices of the company in New York after a service of twenty-two years in the dyestuff trade in New England.

Mr. Moorhouse is one of the best known dye experts in the United States. When, during the war, the dye-



stuff crisis arose in the textile, leather and paper industries, Mr. Moorhouse, because of his long experience both in this country and abroad, was selected as the technical adviser to the Advisory Committee of the War Trade Board. He also served as technical adviser to the Dye Committee of the Textile Alliance which was organized on behalf of the textile industry as the official medium for the delivery to this country of reparation dyestuffs.

Mr. Moorhouse is a member of the board of trustees of the Lowell Textile School. He was also one of the organizers of the American Association of Textile Chemists and Colorists, and is a member of the Council and the Research Committee of that organization.

We feel sure that his many friends in the industry will join with The Reporter in wishing him all manner of success in his new position. There can be no doubt that National's customers will benefit greatly through his unquestioned ability in dyestuff application matters.

GRASSELLI ACTS TO PROTECT DYE PATENT RIGHTS

The Grasselli Dyestuff Corporation has sent out a letter to the trade advising that it will prosecute infringements upon the American patent rights of colors manufactured by Farbenfabriken vorm. Friedr. Bayer & Co., the American rights of which colors being owned by the Grasselli Chemical Company and licensed exclusively to the Grasselli Dyestuff Corporation. The particular form of infrnigement at present under investigation consists in the unauthorized importation and sale of the patented colors by firms other than the Grasselli Dyestuff Corporation.

The latter corporation has appealed to its customers to co-operate with them to stop this infringement as a matter of justice and principle. As those who purchase these patented colors through illegitimate sources thereby become party to the infringement this action involves trade principles of peculiar significance, and its outcome will be watched with interest. The letter to the trade, with which is enclosed an extracted list of the patented colors, reads in part as follows:

"No license has been granted since July 1, 1924, to anyone other than the Grasselli Dyestuff Corporation to import these colors. Therefore, the importation and sales of such patented products by unauthorized parties is an infringement of the patent rights licensed to this company and will be prosecuted wherever possible.

"We beg to express the hope that as a possible buyer of some of these patented products, you will co-operate with us by obtaining your requirements of same either direct from the Grasselli Dyestuff Corporation or through such other reliable dyestuff firms whose reputation is a guarantee that they are offering these colors in a legitimate manner, consistent with our patent rights.

"Yours very truly,

"Grasselli Dyestuff Corporation"

INITIAL MEETING OF CHEMICAL ADVISORY COMMITTEE

The initial meeting meeting of the Chemical Advisory Committee of the Department of Commerce was held on Tuesday, May 19, at the Department of Commerce, Washington, D. C.

It has been felt that there should be some committee composed of men prominent in the industry who would confer with the Chemical Division in Washington at least once a year and preferably more often concerning problems confronting the industry and the part that the Chemical Division should play in meeting such problems.

The contact of the Chemical Division with the industry is limited in that the Division is located in Washington, somewhat removed from the trade centers and close association with developments of a commercial and technical character, and is dependent to a large extent for such contact as it has, upon correspondence, trade publications, occasional visits to the division of representatives of the industry and the infrequent trips made by the Chief of the Division to various points throughout the country. The Division is thus able to keep only fairly well informed, and it has been realized that there was lacking the direct type of advisory co-operation which is essential in order to make the Division most valuable to the industry.

Though other divisions within the Bureau have had such advisory committees for some time past, the Chemical Division felt that it would be best to delay the formation of such a committee until the Division had brought itself to a fair degree of organization, had accomplished results which would warrant the calling in of expert advisers from the industry, and was in a position to consider concrete plans for the future.

The following men were invited by Secretary Hoover to serve on this committee: Dr. Leo Baekeland, past president of the American Chemical Society; Dr. A. S. Burdick, president of the Abbott Laboratories, Chicago; Dr. Charles H. Herty, president of the Synthetic Organic Chemical Manufacturers' Association; Henry Howard, Grasselli Chemical Company, Cleveland; H. E. Howe, editor of Industrial and Engineering Chemistry; G. Ober, president of G. Ober & Sons, Baltimore; E. T. Trigg, president of John Lucas & Co.; A. C. Morrison, Union Carbide & Carbon Corp., and S. W. Wilder, president of the Merrimac Chemical Company.

This committee, therefore, met on May 19, all being present with the exception of Dr. Baekeland and Mr. Wilder, both of whom are abroad.

In addition to the members of the committee, C. C. Concannon, Chief of the Chemical Division, T. W. Delahanty, Assistant Chief, and Messrs. Wizeman and Priest, members of the Chemical Division, were present at the meeting.

Mr. Concannon welcomed those present and outlined the need for such a committee and the type of obligation which it would assume, informing them that they were to serve in an advisory capacity to the Chemical Division and would be the liaison between the chemical industry and the Department. The Committee then proceeded to organize itself, and on a motion by Dr. Herty, A. C. Morrison and H. E. Howe were unanimously elected chairman and secretary, respectively.

The feeling within the Department has been that a small active committee representative of the industry as a whole and composed of prominent individuals selected because of their personal qualifications and not because of their associations would be of more value than a large cumbersome body. The size of the committee and its existing personnel will remain as it is for the present, but the committee thought it well to consider future developments and therefore passed a provision which states that new members may be nominated by the committee and submitted for approval to the Secretary of Commerce and that, if approved, they would then be invited by the secretary to serve on the committee.

It was voted that the designation should be the Chemical Advisory Committee to the Department of Commerce. This will, therefore, permit the committee to interest itself in all of the activities of the Department. It is the desire of the committee to co-operate as close as possible with other bureaus of the Department, or with bureaus such as the Bureaus of Standards or Census.

The committee was made familiar with the history of the Division, and the difficulties attending the establishment of an efficient machine with proper personnel and other points pertinent to the organizing of the Division were brought out. Attention was called to the various services rendered by the Bureau of Foreign and Domestic Commerce as a whole and by the Chemical Division itself. Special emphasis was placed upon the monthly service on dye import statistics. This was selected as a typical example of a highly important and successful piece of work.

The committee was extremely interested in being fully instructed in the organization plan of the Chemical Division and to the extent to which this proposed organization had been developed. It was explained that the Division ultimately hopes to have four sections each in charge of a section chief who will, because of his training and experience, be an expert in his field. These four sections are somewhat arbitrary in definition at this time and would include: 1, Inorganic chemical and fertilizers; 2, Organic chemical derivatives and manufacturers thereof; 3, Paints, Naval stores, and allied materials; 4, Drugs, fine chemicals, and toilet preparations.

In order to adequately care for the tremendous amount of routine work in each of these fields and to develop constructive service it would be essential that each expert be supported by a clerk as a research assistant. Another reason for thus detailing two people to handle each of these four groups is to take care of the decidedly awkward situation resulting from the high turnover in employment to which all Government service is subjected. The Organic Chemical Section is a specific example of this in that the resignation of the Division expert in charge of this work has left that important phase of our activities without anyone to carry it on, and this would not be the case if the proposed plan of organization of the Division can be attained. Continuity of effort and of service is dependent upon adequate staffing of the Division.

Following Mr. Concannon's remarks, the committee was decidedly of the opinion that the chemical industry is not sufficiently aware of what is being done by the Chemical Division and by the Department, and does not appreciate the great amount of service and assistance that is now being offered or could be made available.

Since the primary object of the Chemical Division is the promotion of foreign trade, it was felt that the committee should have presented to it a review of the chemical export situation. Mr. Delahanty, Assistant Chief of the Division, has been making an analytical study of this subject and he gave a very interesting talk based upon his findings on the relation of our exports to our production of chemicals. He presented graphically the ambitions of the Division in this respect and, at the conclusion of his remarks, the committee was decidedly of the opinion that the chemical industry as a whole was in a position to increase exports and that steps should be actively undertaken leading to this end.

The meeting was then thrown open to general discussion in order that the committee might pass upon the past efforts of the Division and that suggestions for the future might be made. This led to a motion by Dr. Burdick that the committee express to Secretary Hoover its appreciation of the service of the Chemical Division and of the really remarkable work that it has been able to accomplish with the means available; also, that it express to the secretary its sincere hope that he will be

able to provide for the expansion of the work along the administrative lines mapped out by the Division.

The need for increased chemical exports and the desire to bring that thought home as well as to suggest means for accomplishing it together with a realization on the part of the committee that the chemical industry is not fully conversant with the facilities available in the Department led Mr. Howard to propose that, when convenient, personal invitations be extended to the heads of the chemical industry to attend a meeting in Washington at which a full understanding of the value of the Chemical Division might be laid before the industry and at which other matters of interest to our American manufacturers might be developed.

The afternoon session was for the purpose of meeting with Secretary Hoover in order that a report of the activities of the morning might be made to him. The chairman, Mr. Morrison outlined what had occurred and expressed the pleasure of the various members at being invited to serve upon such a committee and the desire of the committee to co-operate to the fullest extent in the work of the Department. The resolutions passed by the committee in the morning were presented to Secretary Hoover in turn by the proposers. Mr. Hoover then passed upon the various resolutions and accepted them with such modifications as he felt were called for and, in so doing, he gave an interesting and intimate talk abounding in valuable suggestions.

Following the meeting with Mr. Hoover, Dr. Julius Klein, Director of the Bureau of Foreign and Domestic Commerce, met the committee and the chairman explained to him the developments up to that time. Dr. Klein, because of his position, is intimately familiar with the activities of all branches of American industry, and his talk in outlining what was being undertaken and what had been accomplished by similar advisory committees was extremely interesting and of the utmost value to the committee.

The suggestion was made by the committee that they might like to take advantage of the opportunity of meeting with several of the various division chiefs for the purpose of a round-table discussion and that thus the committee would be able to obtain an intimate knowledge of what other Divisions in the Bureau were doing and that matters of interest might be raised upon which these various experts within the Bureau could shed some light. In accordance with this suggestion the chiefs of the Commercial Intelligence Division, Foreign Tariff Division, Machinery Division and Finance and Investment Division, discussed with the committee the work of the particular division each represented.

The committee adjourned at 6 o'clock, expressing the feeling that the day had been most constructive and promised well for the future. The committee in organizing itself determined that there should be at least one stated annual meeting. It was, however, the unanimous opinion that other meetings should be held which may be called by the Department or by the chairman of the committee prior to the next annual meeting.

TESTS FOR IDENTIFYING ARTIFICIAL SILK

The following are the tests recently announced by the United States Bureau of Standards for the identification of artificial silk. In its announcement the Bureau said:

"There are several methods of identifying artificial silk by chemical tests, their effectiveness depending largely on how carefully the various reagents are prepared.

"The following is offered by the bureau as a more simple and effective method of identifying the artificial silks made by the four basic chemical processes. Although gelatine silk is not important commercially at the present time, its test has been added for comparative purposes.

"When small samples of artificial silk are treated with equal parts of concentrated sulphuric acid and iodine, the following reactions take place:

"1—Viscose silk turns a dark blue color.

"2—Acetate silk turns a yellow color.

"3—Nitro-cellulose silk turns a violet color.

"4—Cuprammonium silk turns a light blue color.

"5—Gelatine silk turns a yellowish brown color.

"In order better to distinguish between viscose and cuprammonium silks, which give a blue reaction with sulphuric acid and iodine, it is necessary to treat these silks with concentrated acid alone, which gives the following reactions after about 15 minutes:

"1—Viscose silk turns a red-brown color.

"2—Cuprammonium silk turns a yellowish brown color."

FOREIGN DYES IMPORTED DURING MAY

(*Continued from page* 388)

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
867	Anthra Brown B Dbl. Pst. (s. s.)—(B)	842
869	Vat Brown R Powder (s. s.)—(By)	440
871	Helindone Red Violet IRRK Pst.—(M)	500
873	Vat Red Brown R Paste Fine—(B)	480
883	Indigo KG Powder—(K)	1,970
890	Ciba Yellow G Paste—(I)	110
901	Ciba Violet B Paste—(I)	
901	Ciba Violet R Paste—(I)	3,085
902	Thioindigo Brown R Powder (s. s.)—(K)	125
904	Helindone Brown G Powder (s. s.)—(M)	700
907	Ciba Scarlet G Extra Paste—(I)	
907	Thioindigo Scarlet 2G Paste—(K)	
907	Thioindigo Scarlet 2G Powder (s. s.)—(K)	11,434
908	Ciba Red R Paste—(I)	4,629
910	Helindone Pink AN Paste—(M)	
910	Helindone Pink BN Paste—(M)	2,000
910	Thioindigo Pink BN Ex. Pst.—(K)	1,000
911	Ciba Orange G Paste—(I)	441
912	Ciba Pink B Paste—(I)	1,102
913	Hydron Orange RF Paste—(C)	
913	Thioindigo Orange R Paste—(K)	5,122

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
918	Ciba Red 3B Paste—(I)	
918	Helindone Reddish Violet IRH Powder (s. s.)—(M)	
918	Thioindigo Red 3B Paste—(K)	
918	Vat Red 3B Paste—(M)	
918	Vat Red 3B Powder (s. s.)—(M)	
918	Vat Red Violet RH Paste—(B)	6,058
919	Ciba Bordeaux B Paste—(I)	
919	Ciba Bordeaux B Powder (s. s.)—(I)	3,081
920	Vat Violet BB Paste—(B)	
920	Vat Violet BB Paste—(M)	
920	Thioindigo Violet 2R Powder (s. s.)—(K)	1,485
922	Diphenyl Black Base I—(M)	500
923	Fur Blue Black A—(A)	
923	Fur Blue Black SA—(A)	
923	Fur Brown 2R—(A)	
923	Fur Brown SKG—(A)	
923	Fur Brown SP—(A)	
923	Fur Brown NZ—(A)	
923	Fur Brown PY—(A)	
923	Fur Gray Brown SLA—(A)	
923	Fur Olive DA—(A)	
923	Fur Red Brown 6R—(A)	570

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Alizarine Rubine R Powder—(By)	
Anthra Rubine B—(K)	580
Alkali Fast Green 3G—(By)	110
Brilliant Scarlet N—(B)	100
Cloth Fast Red B—(I)	110
Cloth Fast Red 3B—(I)	220
Cloth Fast Red R—(I)	220
Cloth Fast Yellow G—(I)	110
Fast Acid Green BB Extra—(M)	500
Guinea Fast Red BL—(A)	500
Guinea Light Blue A—(A)	500
Indigo Carmine Blue FF—(A)	100
Milling Yellow G—(A)	400
Neolan Red B—(I)	110
Neolan Red R—(I)	220
Neolan Yellow R—(I)	220
Anis (Anthosine) 3B—(B)	278
Polar Yellow 2G Conc.—(G)	2,689
Soluble Carmine—(B)	100
Supramine Black BR—(By)	235
Xylene Milling Orange R Conc.—(S)	284

Vat Dyes

Algol Brown G Powder (s. s.)—(By)	4,800
Alizarine Indigo Black B Paste—(By)	399
Alizarine Indigo Brown R Paste—(By)	3,970
Anthra Violet BB Paste—(B)	100
Cibanone Blue 2G Powder—(I)	661
Eridan Brilliant Scarlet B Paste—(K)	50
Grelanone Violet BR Paste—(Gr-E)	560
Helindone Fast Scarlet B Paste—(M)	500
Helindone Fast Scarlet BG Paste—(M)	200
Helindone Printing Black RD Paste—(M)	6,500
Hydron Brown G Paste—(C)	
Hydron Brown G Powder (s. s.)—(C)	
Hydron Brown R Paste—(C)	3,589
Hydron Pink FB Paste—(C)	220
Anthra Pink B Extra Paste—(B)	1,000
Hydron Pink FF Paste—(C)	
Anthra Pink R Extra Paste—(B)	
Helindone Pink R Extra Paste—(M)	5,611
Hydron Scarlet 3B Paste—(C)	1,000
Hydron Yellow NF Paste—(C)	1,000
Hydron Yellow Brown G Paste—(C)	600
Hydron Yellow Olive GG Paste—(C)	600
Indanthrene Blue BCS Powder (s. s.)—(B)	
Helindone Blue IBCS Powder (s. s.)—(M)	
Vat Blue BCS Powder (s. s.)—(B)	5,975
Helindone Brilliant Blue IR Paste—(M)	
Vat Brilliant Blue R Paste—(B)	584
Helindone Brown IG Powder (s. s.)—(M)	
Vat Brown G Paste—(B)	1,020
Indanthrene Gray RRH Paste—(B)	505
Vat Green G Double Paste (s. s.)—(B)	660
Helindone Pink IB Double Paste (s. s.)—(M)	
Vat Pink B Double Paste (s. s.)—(By)	524
Vat Brilliant Violet RRBA (s. s.)—(B)	
Vat Brilliant Violet RRBA Paste—(B)	842
Vat Yellow 12GL Powder—(A)	112

Mordant and Chrome Dyes

Acid Alizarine Gray G—(M)	2,354
Alizarine Cyclamine R Paste—(By)	5
Alizarine Fast Black SP Paste—(By)	300
Alizarine Fast Gray 2BL Powder—(By)	1,162
Alizarine Light Blue R Conc.—(S)	500
Alizarine Light Gray BS Conc.—(S)	936
Anthracene Chrome Blue RWN—(C)	100
Auracine G—(G)	110
Brilliant Chrome Violet 3R Powder—(DH)	220
Brilliant Chrome Violet 3RN—(DH)	220
Chromazurine G—(DH)	991
Chrome Fast Brown TP—(By)	100
Chrome Fast Green GL—(I)	441
Chrome Fast Green GD Extra—(By)	100
Chrome Printing Red Y Powder—(DH)	441
Chrome Printing Violet N—(I)	110
Chrome Yellow RL Extra—(By)	100
Chromorhodine BN Powder—(DH)	441
Chromorosamine BB Powder—(DH)	55
Metachrome Blue Black 2BX—(A)	1,000
Metachrome Olive B—(A)	1,000
Metachrome Olive Brown G Powder—(Bro)	1,000
Metachrome Violet 2R—(A)	100
Pilatus Chrome Brilliant B—(B)	800
Radio Chrome Blue B—(C)	200

Direct Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Benzo Chrome Brown B—(By)	100
Benzo Fast Brown 3GL—(By)	120
Benzo Red 12B—(By)	463
Benzoform Blue G Extra—(By)	5
Brilliant Congo Blue 5R—(A)	200
Brilliant Congo Violet R—(A)	100
Brilliant Sky Blue G—(By)	100
Chlorantine Brown Y—(I)	441
Chlorantine Fast Blue 8GL—(I)	992
Chlorantine Fast Brown 3GL—(I)	2,204
Chlorantine Fast Red 7BL—(I)	662
Chlorantine Fast Violet RL—(I)	220
Chlorantine Fast Violet 5BL—(I)	2,204
Chlorantine Fast Yellow 4G—(I)	2,644
Chlorantine Fast Yellow RL—(I)	1,102
Chlorantine Red 8BN—(I)	1,102
Chlorazol Fast Brown RK—(BD)	500
Chlorazol Fast Helio BK—(BD)	100
Chlorazol Fast Orange AG—(BD)	200
Columbia Catechine G—(A)	500
Columbia Violet R—(A)	100
Developing Blue B—(A)	500
Diamine Azo Fast Green G—(C)	441
Diamine Azo Yellow G—(C)	445
Diamine Fast Blue FFB—(C)	10
Diamine Fast Blue F3B—(C)	10
Diamine Fast Blue FFG—(C)	10
Diamine Fast Blue F3G—(C)	10
Diamine Fast Brilliant Blue R—(C)	10
Diamine Fast Brown GGBB—(C)	150
Diamine Fast Gray BN—(C)	10
Diamine Fast Orange EG—(C)	550
Diamine Fast Orange ER—(C)	1,000
Diamine Fast Rose G—(C)	25
Diamine Fast Yellow R—(C)	10
Diaminogene GG—(C)	441
Dianil Fast Blue GL—(M)	100
Dianil Fast Violet BL—(M)	200
Dianil Light Red 12BL—(M)	100
Diazamine Blue BR Conc.—(S)	5,003
Diazo Brilliant Orange 5G Extra—(By)	200
Diazo Brilliant Scarlet 2BL—(By)	331
Diazo Brilliant Scarlet 6B Extra—(By)	458
Diazo Fast Blue 6GW—(I)	1,323
Diphenyl Fast Gray BC—(G)	220
Fast Cotton Brown RL—(A)	5
Fast Cotton Catechine G—(A)	5
Fast Cotton Catechine O—(A)	5
Fast Cotton Catechine R—(A)	5
Fast Cotton Catechine 3B—(A)	5
Fast Cotton Corinth B—(A)	5
Fast Cotton Gray BL—(A)	300
Parasulphon Brown V—(S)	500
Rosanthrene Fast Bordeaux 2BL—(I)	441
Rosanthrene Violet 5R—(I)	110
Toluylene Fast Orange GL—(By)	110
Triazogene Light Yellow 2G—(A)	224
Triazogene Orange R—(A)	112

Dyes for Artificial Silk

Name of Dye and Manufacturer	Quantity (pounds)
Azonine Direct Violet R Conc.—(C)	25
Dispersol Yellow 3G—(BD)	116
SRA Blue IV—(Q)	450

Rapid Fast Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Rapid Fast Bordeaux B Paste—(By)	100
Rapid Fast Red B Paste—(By)	100

Basic Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Brilliant Rhoduline Blue R—(By)	100
Benzo Rhoduline Red 3B—(By)	542
Tannocyanine 3G—(M)	25
Xantho Acridine GN Extra—(DH)	110

Sulprur Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Cross-Dye Green B—(BD)	8,960
Cross-Dye Green 2G—(BD)	2,273
Katigene Indigo CLGG—(By)	963
Pyrogene Brown G—(I)	441
Thionol Yellow GR—(BD)	376

Color-Lake Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Ceres Blue I—(By)	50
Ceres Orange I—(By)	2
Hansa Green GS—(M)	20
Hansa Orange R—(M)	20
Hansa Red B—(M)	20
Helio Bordeaux BL Paste—(By)	864
Helio Chrome Yellow GL—(By)	5
Permanent Red F3R Powder—(A)	5
Stone Fast Yellow 5G Powder—(B)	500
Tero Yellow FR—(B)	200

Unclassified Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Colonial Blue R—(DH)	110
Florescent Blue—(S)	28
All Other Dyes(Q) ——	130

COLOR LAKES OF COAL-TAR ORIGIN

Name of Lake	Quantity (pounds)
Azure Blue	500
Madder Lake VX Powder	800
Permanent Yellow Powder	100
Root Madder Lake Powder	100
Viridine Lake Powder	100

Sandoz Chemical Works, Inc., are forwarding to the trade their loose-leaf card illustrating Xylene Milling Colors dyed on wool yarn and Gloria. These colors possess excellent fastness to salt water and light.

Dyestuff Tables

A List of the Principal American-Made Colors with Their Properties and Fastness Characteristics

[NOTE: The publishers of The REPORTER have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered. The publication of this data was begun in the issue of March 10, 1924.]

AURAMINE
(Schultz No. 493)

COMPOSITION: Diphenylmethane.

SPECIALLY SUITABLE FOR: Cotton.

USUAL METHOD OF DYEING: On cotton, on a tannin mordant; on wool, in a neutral or soap bath.

SHADE: Very full greenish yellow.

SOLUBILITY: Good at 140 deg. Fahr.; decomposed at the boil.

FASTNESS TO (on Cotton):
Acid: Fast against acetic.
Alkali: Slight.
Boiling: Slight.
Chlorine: Destroyed.
Cross-Dyeing: Fair topped with tannin.
Fulling: Slight.
Ironing: Slight.
Light: Fair for this group of colors.
Rubbing: Crocks.
Steaming: Will not stand steaming.
Sulphur: Fair for this group of colors.
Washing: Fair topped with tannin.
Sizing: Good topped with tannin.

FASTNESS TO (on Wool):
Acid: Fast against acetic.
Alkali: Slight.
Carbonizing: Slight.
Light: Moderate.
Perspiration: Fast.
Rubbing: Crocks.
Steaming: Same as on cotton.
Sulphur: Shade brighter.
Washing: Slight.
Water: Bleeds.

ON OTHER MATERIALS: On wool: Use a little acetic to correct the water. On silk: In bath of boiled-off liquor, neutral or with little acetic. On jute: Dyed neutral at 140 deg. Fahr. On paper: Good for cellulose and wood pulp.

PRINTING: Suitable for calico printing.

DISCHARGING: Discharges white by chlorate, glucose, soda lye and zinc processes. Color discharge work with tin and hydrosulphite. Gives color discharge on alpha-naphthylamine claret.

COMPETING PRODUCTS: Made in the United States by Kerin Manufacturing Company, under name of Auramine; E. I. du Pont de Nemours & Co., under names of Auramine Base, Auramine Conc. and Auramine O; National Aniline & Chemical Company, under name of Auramine NAC; Newport Chemical Works, Inc., under name of Auramine O.

BRILLIANT ACID GREEN 6B
(Schultz No. 503)

COMPOSITION: Triphenylmethane.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Glauber salt and sulphuric acid on wool; Glauber salt on unions.

SHADE: Bright bluish green.

SHADE BY GASLIGHT: Fuller and deeper.

SOLUBILITY: Very good.

LEVEL: Dyes level; can be fed on at boil with care.

EXHAUSTS: Well.

FASTNESS TO:
Acid: Moderate. Turns yellower with dilute muriatic and sulphuric.
Alkali: Very slight.
Carbonizing: Fast.
Chlorine: Good.
Fulling: Does not bleed into white wool. Shade goes yellower.
Ironing: Fast.
Light: Moderate; goes to a dull blue. Suitable for ladies' dress goods.
Perspiration: Fast.
Rubbing: Goods must be well rinsed.
Sulphur: Fast.
Washing: Fairly fast in neutral soap; shade goes yellower.

OTHER PROPERTIES: Suitable for shoddy. The fastness to fulling is the principal feature of this color. It becomes brighter and fresher on fulling.

DYED BY OTHER METHODS: The color can be dyed acid, chrome bottom, top chrome or chromate. By the top-chrome method the shade is duller and by the chromate method the shade is yellower and weaker. It is also suitable for shading top-chrome colors after chroming.

ON UNIONS: Cotton-wool unions: Goes well on the wool in a neutral bath, the cotton being left white. Wool-silk unions: Both fibers dyed the same shade with 10 per cent bisulphate of soda.

ON OTHER MATERIALS: On silk: Dyed in bath of boiled-off liquor broken with acetic acid. It is not fast to water on this fiber. On paper: Add to unsized pulp. Suitable for all sized papers.

PRINTING: Suitable for direct printing on wool pieces and slubbing, and on silk and gloria (acid).

(Continued on page 413)

Technical Notes from Foreign Sources

Coloring Cotton Piece Goods with Sulphur Colors

The essential condition in the dyeing of cotton piece goods with the aid of sulphur dyestuff is a very thorough preliminary treatment. But in this case it must be mentioned that the same treatment of the fabrics will not serve under all conditions, and, furthermore, not every preliminary treatment will give the desired results when the sulphur colors are employed. The character of the fabric must be taken into consideration. For example, goods which do not contain any sizing must be boiled with soda and then washed. But when the cotton is sized slightly, this treatment will not give good results in the dyeing process, and, of course, this is much more so when strongly sized cotton fabrics are being colored.

The author had an interesting experience with cotton goods which had been very slightly sized. After being boiled out with soda and then washed, the goods were dyed. A good uniform color was obtained, but when a second lot of goods were treated in exactly the same manner the good results first obtained were not duplicated. Parts of the fabrics were clouded with color spots. Then another piece of goods was taken and subjected to the same treatment, and this time good results were again obtained. After examining the conditions closely under which the dyeing was carried out, it was found that the piece of goods which had not given good results had been allowed to remain overnight after being boiled and washed. It could be determined only that the partially softened size had hazardened again on the goods and had produced the spotty appearance. Still another piece of goods was treated with acid in the place of alkali and allowed to stand overnight after washing. Good results were obtained when the goods were dyed the next day, and thereafter the alkali treatment was permanently substituted by the acid treatment.

It is evident that the boiling with soda does not remove all of the sizing, and it is only possible to wash out all of the size when the latter is first rendered soluble, which can be done with the aid of acid. However, in the case of strongly sized fabrics it is necessary to employ diastafor.

In dyeing the fabrics with the aid of the sulphur dyestuffs it is advisable to add substances, such as Turkey Red oil, Monopole oil and the like to the dye bath, as they facilitate the dyeing process and yield a more uniform color on the fabric. It is essential to see that the proper quantity of sodium sulphide is present in the dye bath, so that the coloring matter remains dissolved completely. But then a too great excess must be avoided, for this tends to give light shades, which means that more than the necessary amount of dyestuff will be consumed in the operation. It is also very important to wash the dyed goods entirely free of the dye liquor immediately after they are taken from the color bath. This is done by passing the cloth between squeeze rools, which, if not made of rubber, must be covered with thin cotton cloth, so that all parts of the dyed fabrics are subjected to the same degree of pressure between the rollers. The immediate removal of the excess coloring matter, when the goods are not sent at once to the washing jigger, is necessary in order to avoid the formation of spots in the fabric. (Deutsche Faerber Zeitung, 1925, 361.)

New Vat Coloring Matters

According to French Patent No. 568,999 a new process has been devised for the manufacture of vat dyestuffs. The process may be applied as in the following example. About fourteen parts by weight of sulphuryl chloride are gradually added to 37.3 parts by weight of the coloring matter obtained from beta-naphthisatin alpha chloride and alpha anthraquinone which are suspended in 500 parts of chlorobenzene. The mixture is stirred and cooled while the reaction is going on. The temperature is then carried to 70 deg. Cent., and the chlorination results with the evolution of sulphur dioxide and hydrochloric acid gas. When the reaction is complete the mixture is allowed to cool down and the dyestuff is recovered on the filter. The product obtained in this manner is a crystalline bluish black powder. When treated with a solution of an alkaline hydrosulphite, such as sodium hydrosulphite, its color changes to a brownish orange which dyes the fabric in bluish black shades.

Mercerizing Cotton with a Permanent Finish

Cotton fabrics are passed through a solution of zinc chloride of 82 to 104 deg. Tw. The strength of the solution varies according to whether the material is thin and loose or thick and heavy. The fabrics are then immediately dried, or they may be allowed to remain for several hours. The drying operation is carried out on enameled or polished cylinders heated to a temperature of 99 to 100 deg. Cent. The contact of the cloth with the cylinders lasts about thirty seconds, and this treatment is sufficient in ordinary cases to give the fabrics a glass like surface.

Immediately after the fabrics are dried, they are treated in a acid bath. Then the excess acid is removed and the fabrics are washed. A firm transparent sand-paper finish, usually known as the "organdie" finish, is obtained in this manner. On the other hand, by mercerizing with a solution of sodium hydroxide either before or after-treating the fabric as described, the finish can be changed to a soft transparent effect which is permanent. Resist printing results in watered and crepe effects on such fabrics. (British Patent No. 225,680.)

Color Lakes Fast to Light

Basic dyestuffs or acid coloring matters which contain an amino as well as a sulphonic acid group are prepared with complex acids which contain both tungsten and molybdenum. The products are appreciably faster to light than those which contain either tungsten or molybdenum alone. (German Patent No. 403,002.)

Bleaching Linen, Hemp and Half-Linen

Linen and similar textile fibers are thoroughly impregnated with a neutral alkaline or acid sulphite solution, then squeezed and allowed to stand for some time, the temperature being maintained below 35 deg. Cent. and oxidation prevented. The fibers are afterwards bleached by hydrogen peroxide or a per salt. (German Patent No. 400,804.)

Dyeing Wool

Appropriate vat coloring matter may be employed in the dyeing of woolen fabrics and the dyeing process may be carried out in one dip when an ammonia glue hydrosulphite vat is employed. It is necessary to add an ammonium salt and then an acid or an acid salt to the dye liquor during the dyeing process.

For example, in obtaining a green shade on loose wool the following details of the process are interesting. About 3,000 liters of water are placed in an open vat and half a per cent of glue is added, as well as 2 per cent of ammonia, the same amount of concentrated hydrosulphite, 2 per cent of Helindon Yellow CG vat, and 5.5 per cent of Indigo vat preparation. Into this liquor are introduced 100 kg. of wool, when the temperature of the vat is brought up to 50 deg. Cent. The woolen goods are worked in the liquor for a period of 20 minutes and then from 2 to 3 per cent of ammonium sulphate are added. The dyeing is then continued for another 20 minutes, the bath being finally exhausted by means of acetic acid. About 3 to 4 per cent of the acid is employed for this purpose, and the time consumed in this last stage of the dyeing process proper is 15 minutes.

The diluted solutions of the ammonium salt and the acid should be added very slowly, while it is essential that the liquor should be as nearly neutral as possible after the addition of the former. While the vat liquor is being discharged from the vat, cold water is added so that the wool floats in the water. Finally the water is removed and the wool is hydroextracted or oxidized in baskets. This process is also well adapted for dyeing wool in mechanical apparatus. (British Patent No. 213,266.)

Finishing and Ornamenting Textile Fibers

Cotton, wool, linen and other fabrics are treated with a 1 to 3 per cent solution of cellulose in ammoniacal copper hydroxide and then subjected to further treatment with chemicals which result in the formation of insoluble compounds of copper. Such agents may be applied before or after the treatment with the cellulose solution. Suitable mordants, pigments and dyestuffs, etc., may be added. The fabric to which the cellulose solution has been applied may be treated with caustic soda or soap solution with the result that a dark brown color is produced on it. On the other hand, treatment with sulphide and polysulphides give blackish greens and blacks. Suitable dyestuffs may be added to the sulphide solutions so as to produce a black pattern on a colored ground. Ammonium molybdate and ammonium vanadate yield a light green and a greenish yellow respectively. Numerous other effects may be obtained with the use of different chemical reagents. (British Patent No. 227,370.)

Action of Oxalic Acid on Formation of Aniline Black

When aniline salt is printed on cotton materials which have first been slop-padded with dichromate of soda or the like and when oxalic acid is present in the printing paste, the result is the so-called momentary Aniline Black coloration. This "lightning black" can only be produced when oxalic acid is present as only this substance will cause this color to be formed. Oxalic acid plays a similar role in the discharge printing with vat dyestuffs according to the chromate method. In this case the indigo is oxidized to isatin.

In both cases the action of the oxalic acid is to be assigned to the reduction of the chromic acid with the formation of intermediary chromium oxides, chromium dioxide or chromium tetraoxide. This decomposes at once to give chromium trioxide and oxygen, and the oxygen, being in the nascent state, has a very powerful action. The author has been able to prepare alphanaphthylamine brown (puce) by this process, by printing cotton goods which have been slop-padded with the aid of bichromate of potassium with alpha naphthylamine hydrochloride in the presence of oxalic acid. The brown coloration is similarly instantaneously formed on the fabric. (Der Textilechemiker und Colorist, 5, 179.)

Theory of Dyeing

In an article which is published in the Annali Chim. Appl., 1925, pages 4 to 16, there is contained a discussion of a theory of dyeing which is advanced as a result of much study and actual experimentation. This theory states that the process of dyeing consists, not in salt formation, but in the simple adsorption of the dyestuff by the fiber. The experiments show that the quantity of the coloring matter that is fixed on the fiber varies within certain limits with the concentration of the dye liquor, and that less dyestuff is absorbed from a solution which an emulsoid stabilizer, such as gelatine, than from a solution which does not contain the stabilizer.

Mercerization and Finishing of Textiles

Two important British patents, Nos. 228,654 and 228,655, have been issued on processes involving the mercerization and the finishing of textile fabrics. In the first patent the process of mercerizing fabric is described, in

which the materials are treated with aqueous solutions of calcium thiocyanate. The exact details of the treatment are given in a prior patent British Number 196,696. The fabric is then calendered (schreinering, glazing, swissing, embossing and like treatment with combined heat and pressure) at a stage in which the threads are still in a moist plastic condition, whereby they are dried, flattened and given a high permanent luster.

The second patent describes how it is possible to give permanent organdie and wool-like effects by subjecting the cotton fabric to alternate treatments with caustic soda and aqueous solutions of calcium thiocyanate which have boiling points of 150 to 170 deg. Cent. and no solvent power for cellulose. Organdie effects are produced by treating the fabric mercerized by means of sodium hydroxide with a solution of calcium thiocyanate at a temperature varying between 125 and 155 deg. Cent. for not more than one minute. It is preferable to repeat these treatments thus, mercerization, thiocyanate treatment, mercerization, thiocyanate treatment, and final mercerization.

For example, mercerized lawn fabrics are treated at a temperature of 148 deg. Cent. for a period of 10 seconds with a solution of calcium thiocyanate which has a boiling point of 160 deg. Cent. Then the fabric is washed and dried. Wool-like effects are produced by treating the fabrics which have been mercerized by means of a solution of calcium thiocyanate at a temperature of 80 to 120 deg. Cent. for a period of 15 to 16 minutes. For example, mercerized lawn fabric is treated at a temperature of 108 deg. Cent. for fifteen minutes with a solution of calcium thiocyanate having a boiling point of 160 deg. Cent., then washed and dried. Suitable mixtures of calcium thiocyanate and chloride may be used. The temperature of treatment at which the best results are obtained rises with rise of the boiling point and concentration of the thiocyanate solution.

DYEING ACETATE SILK

(*Continued from page* 384)

Chlorazol Black BH
Cross Dye Yellow Y
*Chlorazol Fast Yellow B
Chlorazol Fast Red FG 9202 K
Thional Corinth RBX
*Thional Blue 2B
Thional Black Brown R 9146 K
Thional Black XXN Concentrated
*Thional Black OG
*Cross Dye Sky Blue FFS
*Cross Dye Green 2G Concentrated
Cross Dye Brown 2R
*Cross Dye Black BX

Method No. 60: Combined Saponification and Dyeing of Acetate Silk-Cotton Unions.—Briggs, Richardson and the British Cellulose & Chemical Manufacturing Company have covered a novel method of dyeing acetate silk-cotton unions by the saponification process in British Patent No. 178,946, of January 27, 1921. The union is worked in a dye bath containing small quantities of soap and/or soda ash at a temperature below 50 deg. Cent. (122 deg. Fahr.) until the cotton is fully dyed, leaving the acetate silk but slightly stained. The temperature of the bath is then raised to 75 or 80 deg. Cent. (167 or 176 deg. Fahr.) and a small amount of alkali, e. g., up to 10 per cent of caustic soda on the weight of the acetate silk is added. As the saponification proceeds, the color bleeds from the cotton onto the acetate silk. By properly controlling the process, level shades may be obtained. Sodium carbonate, sulphide, silicate, aluminate and borate, as well as the hydroxide are suggested as saponifying agents.

A combined saponification and mordanting process is covered by British Patent No. 224,218, November 3, 1923, to the Society Alsacienne de Produits Chemiques. In this patent it is suggested to use a saponifying and mordanting bath containing sodium hydroxide or phosphate with a sulphurized compound of phenol or its derivatives or substitution products, (see British Patent No. 215,012). It is stated that the shades obtained with basic dyes are similar to those obtained on a tannin mordant and that the treatment with antimony salts is not necessary. The mordant may be used in the same bath with substantive or sulphur dyes, when these are to be topped with basics.

(*Part VIII will appear in an early issue.*)

NEWPORT ANNOUNCES TWO NEW ANTHRENE COLORS

Leaflets describing two new Newport products, Newport Anthrene Blue 3GX and Newport Anthrene Black C Paste, have been issued by the Newport Chemical Works, Inc. Each leaflet contains swatch bows showing the color and gives in detail the application, notable properties, fastness properties and other information regarding each color.

The Anthrene Blue 3GX is said to produce a very pleasing shade of greenish blue, possessing excellent fastness to light, boiling soap, rubbing, alkalies, cross-dyeing and steaming. It becomes somewhat greener, duller and weaker with chemic but the shade may be restored with hydrosulphite conc..

Newport Anthrene Black C Paste is a direct dyeing vat black not requiring a special chlorine treatment to develop its shade. It is described as having the excellent fastness qualities of this class of dyestuffs as shown in the table printed on the leaflet. It is not suited for printing purposes.

Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, sailed recently for a three months' tour which will include the larger cities of the Continent and the British Isles. The trip will be purposely for an inspection of the European office of the Department of Commerce and a survey of competitive conditions in Continental markets. It will also enable the director to obtain first-hand information regarding the problems affecting extension of American trade

Highs and Lows in a Busy Chemist's Life Part V

(*Continued from page 370*)

Filing Chemical Notes—A Changeable Blue—Trade Agreements—Showing the Purchasing Agent

I IMAGINE all chemists keep notes of some kind for personal use. I do, and have tried all the different ways of doing it. The best of all is a filing drawer or case for standard typewriter size sheets. All sorts of material, notes, correspondence, clippings and pamphlets can go in a single file, which in itself is a very great convenience.

The ordinary note-book is of little use. The loose-leaf is very limited if there is any great amount of material, except for the pocket, and in the 8½ by 11 size for current use in desk or laboratory.

A small card index was used for a long time, but finally became outgrown. It never furnished a place for anything but brief references so the information on hand was filed in more than one place. When it was discarded a lot of cards had to be scrapped or copied in the interests of efficiency.

Smaller sheets than 8½ by 11 are better than small cards, but they do not fit in with correspondence or other standard size documents.

In the Boston bag epoch, and previous, standard sheets were sometimes difficult to transport, but now in this brief-case era they are all the better.

We did not set out to write a long dissertation on filing systems, but having made so many mistakes through inexperience, want to advise the coming generation to start near right as possible. The standard 8½ by 11 will take anything smaller, and most larger sheets with a single fold, it will accommodate many magazine pages that may be filed and will take many others by a little clipping of the margin. It will take all correspondence and copies of reports as usually made, many pamphlets directly and others by opening out flat. In fact, there is now a tendency to issue advertising matter in 8½ by 11 loose-leaf sheets or in other forms that can be readily kept in standard files. I also find that writing notes into text or reference books is not a very good practice as they go by altogether too quickly and have to be replaced by new books or new editions, and the notes are then of little value. Put them on standard sheets in a file.

And one thing more, always date the notes, and then you will know to what extent to depend on them five years from now.

Advice is cheap, but the lesson learned by the method of trial and failure is to start out in the same way in which you are likely eventually to end.

I suppose it is something to be proud of, although I never thought of it that way before, that the first dyes that I ever tested were American colors offered against the old German types. Well, at any rate, they did not get adopted, for reasons that have been pretty well aired during the past ten years.

Routine dye testing did not offer so much in the way of excitement as some other pursuits. There were times, however, when the famous foreign colors were not all that they should have been. A keg of acid blue came out ten per cent weak and we made a claim for the difference. Meanwhile, from noticing that the shade was a little different, we found it to be a mixture shipped in place of the regular straight color. To iron out this great difficulty, the salesman came and brought a technical man along, too. Various arguments were advanced to show that there really was not much difference after all. Finally I stuck the dyeings from type samples and delivery under an electric lamp, and if any argument was needed for a clincher, there it was. The type held its shade and the delivery went almost purple. The claim was paid. If piece dyeings from both had been used in the same lady's suit, by stepping under an electric light she could have had the grotesque court-jester effect at will.

There are many deep dye subtleties that an ordinary mortal could not profess to understand. Among them were the sacred agreements between the foreign dye manufacturers. A more or less famous example was Sulphon Cyanine 5R Extra made by at least two companies and sold by both at 65 cents. If you took a sample from one and sent it to the other, marked with its true name, it would be offered at 65 cents. But, if you sent it in without marks, and merely asked for a match, you got a quotation of 35 cents for the same strength, i. e., for the standard dye, but under some other name. The reason was that the first company was also selling it under a strange name at a figure far below the agreed price. If all trade agreements were kept as faithfully as that one, we might as well have a *laissez faire*, and be done with it.

Curiously, a certain wool dyer was regularly using tins of Sulphon Cyanine 5R Extra at 65 cents and barrel lots of the same thing from the same manufacturer's agent under a different name for about 42 cents a pound. Such mysteries are deeper than cross-word puzzles.

This occurrence brings to mind another. It appears that the management suspected that a dyer was not giving a reasonable chance to competing colors that were evidently identical and would do the work at a lower cost.

I was asked to sample a couple of tins and report whether they were the same as colors already in use, and after rather careful tests, reported that they were. The dyer reported that they were entirely different and that he could not use them. Months, or years afterwards, I heard the rest of the story. The two tins of colors were packed from two of his own barrels in regular use and merely given the competitor's label.

One thing leads on to another. Purchasing agents are a highly enlightened group of individuals, in their own estimation at least. They have got to be shown, and we had one of that kind.

Someone had just begun marketing caustic soda from a new plant and offered it at an attractive figure, as well they ought, for it left a lot of mud in the dissolving tank

and only tested 90 or 92 per cent NaOH. Mr. P. A., however, was not satisfied with our analysis. "There's a lot of free masonry in this business. We've got to check you up on this, young fellow." He asked for samples of both kinds of caustic and I gave them to him out of the ground samples in the laboratory sample jars. Nothing more was heard of the matter, so one day I asked him how his test came out. "Well, they came out about the same as yours."

The joke, however, was that if we had been crooked, he would not have caught us that way, for we could have easily rubbed a little salt or soda ash in with the inferior caustic and made it as bad as you please. His wisdom did not extend to samples.

RECENT PATENTS

Coloring Matter

(1,531,098; March 24, 1925)

Karl Holzach, Mannheim, Germany, assignor to Badische Anilin- & Soda-Fabrik, Ludwigshafen-on-the-Rhine, Germany.

The new coloring matters which are produced by condensing in an alkaline medium dinitro stilbene disulphonic acid and an amino azo compound containing ortho hydroxylated aryl carboxylic acid substituted by the azo group in para position to the hydroxy group, the coloring matters dyeing cotton directly orange or brown shades, which dyeings on treatment with a heavy metal salt assume altered shades and enhanced fastness.

Vat Dyestuffs and Process of Making the Same by Condensing Thioderivatives of Benzoquinones with Arylamines

(1,530,670; March 24, 1925)

Richard Herz, Frankfort-on-the-Main, Germany, assignor to Leopold Cassella & Co., Gesellschaft mit beschrankter Haftung, a corporation of Germany. (Granted under the provisions of the act of March 3, 1921, 41 Stat. L., 1313.)

The manufacture of vat dyestuffs containing sulphur for dyeing animal fibers, which consists in condensing primary arylamines with a quinone of the benzene series, in which at least one atom of hydrogen is replaced by the group Sx (where x means a monovalent radical).

Production of Coloring Matters

(1,531,262; March 24, 1925)

Arthur Hugh Davies, deceased, late of Willenhall, England; by Mary Olivia Davies, administratrix, Willenhall, Eng'and, and Robert Fraser Thomson, Carlisle, England, assignors to Scottish Dyes, Ltd., Carlisle, Cumberland County, England.

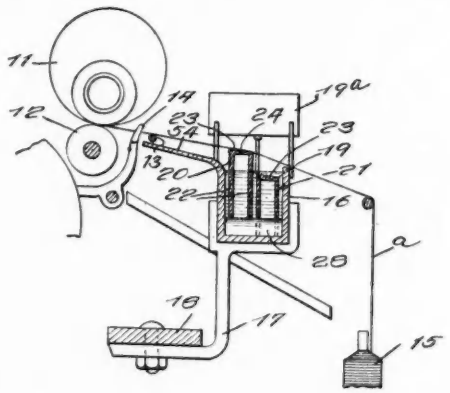
A process for the production of a dyestuff which comprises the treatment of an oxidation product of dibenzanthrone with dimethyl sulphate followed by crystallization from a nitrobenzene solution.

Yarn-Moistening Mechanism

(1,531,189; March 24, 1925)

James A. Johnson, Danville, Va., assignor to Danville Conditioning Machine Company, Inc., Danville, Conditioning Machine Company, Inc., Danville, Va.

Yarn-moistening means, including a trough adapted to contain liquid and disposed beneath the traveling



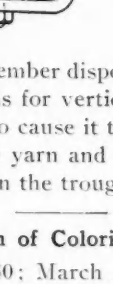
yarn, a moistening member disposed in the trough, and power-operated means for vertically reciprocating the moistening member to cause it to be alternately raised into contact with the yarn and lowered bodily downward into the liquid in the trough.

Production of Coloring Matters

(1,531,260; March 24, 1925)

Arthur Hugh Davies deceased, late of Willenhall, Eng.; by Mary Olivia Davies, administratrix, Willenhall, England, and Robert Fraser Thomson and John Thomas, Carlisle, England, assignors to Scottish Dyes, Ltd., Carlisle, England.

The process of producing coloring matters of the anthraquinone series which consists in the oxidation



Iso Dibenzanthrone

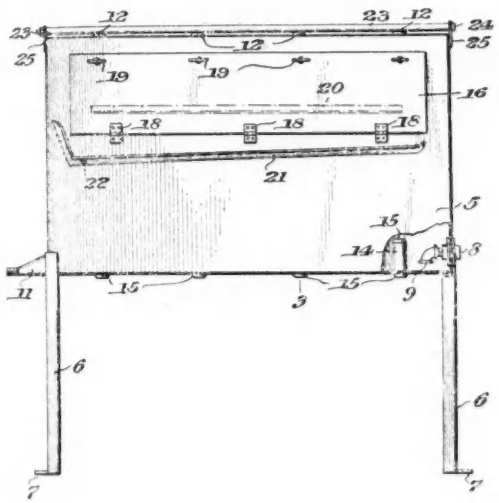
of isodibenzanthrone and the partial reduction of the product, followed by the introduction of an organic radicle.

Apparatus for Softening Yarn

(1,531,436; March 31, 1925)

Benjamin Gibbs, Ardmore, Pa.

An apparatus of the class described, comprising a box, shell or drum, means for admitting steam to the box, a yarn guide in the upper part of the box, a yarn



guide in the lower part of the box, a door or closure for the box, and means on the outside of the box to catch condensation below the closure.

DYESTUFF TABLES

(*Continued from page 407*)

DISCHARGING: The dyed shade on wool gives a white discharge with zinc dust, but cannot be discharged with tin salts, and is therefore suitable for color discharge with tin.

REMARKS: This color will sometimes be found as an adulterant in Alizarine Green CG Extra.

COMPETING PRODUCTS: Made in the United States by National Aniline & Chemical Company, under name of Fast Acid Green B; Newport Chemical Works, Inc., under name of Fast Milling Green B.

LIGHT GREEN SF (BLUE SHADE)

(Schultz No. 504)

COMPOSITION: Triphenylmethane.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Glauber salt and sulphuric acid.

SHADE: Yellowish shades of bright green. Yellower than S-495.

SOLUBILITY: Good.

LEVEL: Dyes level only with care.

FASTNESS TO:

Acid: Fast.
Alkali: Slight.
Carbonizing: Stands carbonizing.
Fulling: Moderate.
Ironing: Fast.
Light: Moderate.
Rubbing: Fast.
Steaming: Fair.
Street Dirt: Very good.
Sulphur: Shade changed.
Washing: Moderate.
Water: Moderate.

ON UNIONS: Cotton-effect threads are unstained.

ON OTHER MATERIALS: On silk: In bath of boiled-off liquor and sulphuric acid. On paper: Add to unsized pulp. Suitable for all sized papers.

PRINTING: On wool, suitable.

COMPETING PRODUCTS: Made in the United States by Calco Chemical Company, under name of Fast Acid Green N

LIGHT GREEN SF (YELLOW SHADE)

(Schultz No. 505)

COMPOSITION: Triphenylmethane.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: With Glauber salt and sulphuric acid.

SHADE: Bright green; yellow overhead.

SHADE BY GASLIGHT: Fuller and yellower.

SOLUBILITY: Good.

LEVEL: Dyes level with care; inferior to S-502.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Fast.
Alkali: Very slight.
Carbonizing: Fast.
Chlorine: Very sensitive.
Ironing: Fast.
Light: Moderate.
Perspiration: Moderate.
Steaming: Fair; changes shade.
Street Dirt: Very slight.
Sulphur: Moderate.
Washing: Moderate.
Water: Moderate.

SENSITIVE TO METALS, LIME: Sensitive to copper; the shade goes bluer and duller. Sensitive to iron; the shade is destroyed.

ON UNIONS: Cotton and artificial silk effect threads are left white. Wool-silk unions: The wool is heavier than the silk when dyed with acetic. Both fibers equal with sulphuric.

ON OTHER MATERIALS: On silk: Dyed with boiled-off liquor and sulphuric acid; not fast to water on this fiber. On paper: Add to unsized pulp; suitable for all sized papers. Lakes: Suitable. Feathers: Suitable.

PRINTING: Prints on wool and silk (acid).

COMPETING PRODUCTS: Made in the United States by E. I. du Pont de Nemours & Co., under name of Pontacyl Light Green SF (Yellowish).

STANDARDS FOR TESTING FASTNESS PROPERTIES

(*Continued from page 385*)

ironing, to sulphur, to perspiration, to alkali, to acid boiling, to bleaching, to fulling, to carbonization, to potting, to decating, to sea water.

The necessary fastness determinations for silk are being worked out and will follow in a few months.

The degrees of fastness for cotton and wool are in general I-V, but for fastness to light are I-VIII. I always represents the lowest and V or VIII the highest degree of fastness.

It might be desirable if industry and trade could unite on expressing the degrees of fastness by suitable descriptive words.

As an individual I suggest the following gradations:

For All Fastnesses Except Fastness to Light

I and II.....fair
III.....good
V.....of the highest fastness
IV.....very good

For Fastness to Light

I and II.....fair
III and IV.....good
V and VI.....very good
VII and VIII.....of the highest fastness.

By the expression "of the highest fastness" we may assume without further comment that the highest fastness available at the time is meant; when further advances are made it is obvious that these highest figures would be suitably raised.

It is unquestionable that in the course of time improvements in the determination of fastness will be made, but it seems desirable to put the standards worked out by the Fastness Commission which seem to me to be of fundamental importance into immediate use.

TEXTILE ALLIANCE FUNDS TAXED

At the office of the Textile Alliance, Inc., it was recently stated that the Commissioner of Internal Revenue has computed a tax liability of $1,286,356.09 on the funds in the hands of the Textile Alliance, Inc., in respect to its operations from 1918 to 1922.

A portion of these funds consist of balances remaining from the Alliance's charges in connection with the importation of the wool, jute and other materials, the unexpended portion of which after payment of all charges, it is under contract to return to the principals for whom it acted. The remainder of the tax is imposed upon funds accumulated in connection with the importation and distribution of dyestuffs under various agreements with the State Department. In most of these agreements it is provided that three-fourths of the funds accruing thereunder shall be paid to the Treasury Department subject to a recommendation of the Secretary of State that they be appropriated by Congress by educational and scienific purposes, the remaining one-fourth to be applied likewise to educational and scientific purposes under the supervision of the underwriters who made the transactions possible without profit to themselves.

The case appears to present unusual and perhaps unprecedented issues and will no doubt be protested.

NATIONAL BRILLIANT WOOL BLUE B

Among the new types of blues that have recently been brought to the attention of both wool and silk dyers, one of the most important is Brilliant Wool Blue B of the National. This product dyes wool beautiful bright blue shades, and is useful not only for worsted fabrics but for wool and silk mixtures when the silk is to appear of the same shade as the wool. Besides its usefulness as a straight color for blues, it is well suited for shading purposes in combination with other acid dyes available for wool, as well as for after-treatment in combination witr chrome colors.

This new blue, it is claimed, possesses good fastness to washing, fulling, decatizing, and excellent fastness to both stoving and perspiration, properties which are said to recommend it for blues and relative shades on dress materials. We understand that product samples with full technical directions are to be obtained from any of the offices of the National Aniline & Chemical Company, Inc.

TEXTILE CHEMIST

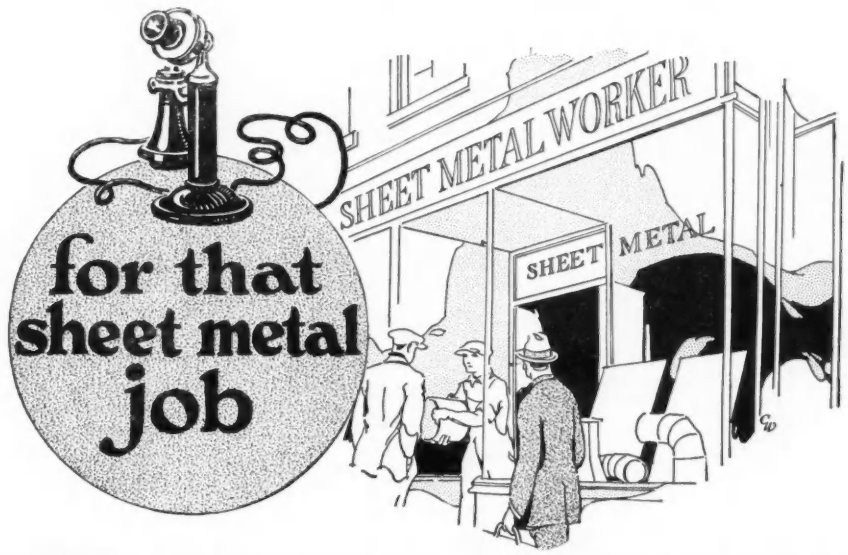
Eleven years' experience in the application of color to all fibers, bleaching, printing, testing dyes and chemicals; desires position with progressive concern. Address replies to Box 302, American Dyestuff Reporter.

TEXTILE CHEMIST

A young man, 26, married, desires opportunity with reliable dyestuff concern. Has had ten years' experience in every phase of laboratory work, standardizing, matching, etc. Familiar with dyestuffs on all fibers. Excellent references. Address Box 303, American Dyestuff Reporter.

POSITION WANTED

Color mixer in print room. Four years' experience. Technical education. New Jersey preferred. Address Box 304, American Dyestuff Reporter.



Use Monel Metal and your telephone

A TELEPHONE CALL to your sheet metal worker will help to settle the question of how you can best secure a permanent lining for a dye tub or a roof for the dye house. He will also supply you with Monel Metal ladles, dippers and scoops that will last through years of dye house use.

For your sheet metal worker knows what metal such jobs require. He knows, too, that Monel Metal is ideal for such uses.

He knows that Monel Metal:

—resists the corrosive attacks of dye house chemicals

—won't rust

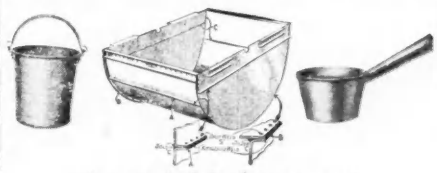
—has steel-like strength that assures years of service

—is easily kept clean

—has a smooth surface that is harmless to fine fabrics.

Monel Metal is available in the form of sheets, rods, wire, strip, etc., and can be fabricated into any desired form. It can be drawn welded, machined, forged and cast.

Monel Metal is suitable for such a wide variety of dye house uses that there is not space to list them all. Below we have mentioned a few of the common uses in the textile industry—many of which you will recognize as fitting in with your immediate needs.



Some typical dye house uses of
MONEL METAL

Bleaching Kier linings	Scoops	Filter Cloth	Instruments
Dye house trucks	Pails	Flashings	Dye-sticks
Dye tub linings	Dippers	Sky light	Paddles
Exhaust ducts	Ladles	Shelving	Tie Rods
Splash plates	Hoods	Strainers	Spiders
	Roofs	Gutters	Nuts and Bolts
	Beams	Ventilators	

Get in touch with your sheet metal worker now and let him tell you how inexpensive—in the long run—it will be to use Monel Metal where you need it most. Or let us send you booklets and folders which will give you full information about this all-around metal.

SEND FOR "LIST B" OF MONEL METAL AND NICKEL LITERATURE

THE INTERNATIONAL NICKEL COMPANY
67 WALL STREET NEW YORK CITY

Monel Metal is a technically controlled Nickel-Copper alloy of high nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company. The name "Monel Metal" is a registered trade mark.

INCo Monel metal

Have You a Technical Library?

Every dyehouse and every dye laboratory should have its five-foot shelf of technical books. Where dyes are used day after day those who use them should make it their duty to themselves and to the mill they work for to know something about the theoretical side of dyeing, bleaching, finishing and textile chemistry in general. The value of this knowledge, though it is easily obtainable at very small cost, is usually under-estimated by those who need it most. It is essential in order to be conversant with up-to-date methods and processes that every dyer and textile chemist have ready at hand for convenient reference a row of authoritative technical books.

AFTER a careful examination of publishers' catalogs we have compiled a new folder describing books on dyeing, bleaching, finishing and allied subjects. This will be sent free upon request. Fill out the coupon at the bottom of the page and mail to the Howes Publishing Company, 90 William Street, New York City.

A catalog of the leading

Technical Books

on

Dyeing
Printing
Bleaching
Finishing
Sizing
Dye Chemistry

HOWES PUBLISHING COMPANY,
90 William Street, New York City.

Kindly send me your new "Catalog of the Leading Technical Books" on Dyeing, Bleaching, Finishing and related subjects.

Name .....

Address .....

UNITED CHEMICAL PRODUCTS CORPORATION

IMPORTERS, EXPORTERS AND MANUFACTURERS
YORK AND COLGATE STS., JERSEY CITY, N. J.

Manufacturers of

DIRECT FAST BLACK L
DIRECT FAST BLUE 4 G L

Also Announcing Our New Product

DIRECT FAST BLUE 2 G L

CHARLOTTE, N. C. ——BRANCHES—— PAWTUCKET, R. I.

THE DYER,

Calico Printer, Bleacher and Finisher.

The only Organ of these trades in Great Britain

43rd YEAR OF PUBLICATION

The Dyer has already a large circulation in the United States and throughout the American Continent.

Add the name of your firm to the list.

Published on the 1st and 15th of each month by

HEYWOOD AND COMPANY, Ltd., 150 Holborn, London, E. C. 1

Subscription 12/6 per annum, mail free.

HOWES PUBLISHING CO.,
90 William Street, New York.

.....192...

Please enter my subscription for the American Dyestuff Reporter for one year from date, for which you may bill me $5.00.

.....

.....

Canadian Postage $5.50: Foreign $6.00.

.....

Index to Advertisers Appearing in This Issue

Althouse Chemical Co.	—
American Aniline Products, Inc.	—
American British Chemical Supplies, Inc.	—
American Dyewood Co.	—
American Laundry Machinery Co.	VIII
Arabol Manufacturing Co.	—
Arkansas Co.	IV
Arnold, Hoffman & Co.	—
Atlas Electric Devices Co.	—
Bosson & Lane	X
Borne, Scrymser Co.	—
Calco Chemical Co.	XII
Campbell, John, & Co.	V
Carbic Color & Chemical Co.	—
Ciba Co.	—
Corn Products Refining Co.	—
David, S. R., & Co.	VIII
Dunker & Perkins Co.	X
Du Pont de Nemours, E. I., & Co.	III
Dye Products & Chemical Co.	—
Dyer & Calico Printer	XV
Fleischmann Co.	VIII
Fletcher Works	VI
Fortner, L. B., & Co.	—
Foster, Edward C.	—
French Lick Springs Hotel	VI
Geigy Co., Inc.	—
Grasselli Dyestuff Corp.	—
Hussong Dyeing Machine Co.	VI
Innis, Speiden & Co.	—
International Nickel Co.	XIII
International Salt Co.	V
Jennings & Co.	XVI
Kali Manufacturing Co.	IX
Klauder-Weldon Dyeing Machine Co.	VII
Klipstein, A., & Co.	Back Cover
Lewis, John D.	VIII
Malt-Diastase Co.	—
Metz, H. A., & Co.	—
National Aniline & Chemical Co.	XI
Newport Chemical Works	Front Cover
Noil Chemical & Color Works, Inc.	—
Onyx Oil & Chemical Co.	IX
Permutit Co.	VII
Roessler & Hasslacher	—
Rohm & Haas Co.	IV
Sandoz Chemical Works	VII
Society of Dyers and Colourists	Third Cover
Solvay Process Co.	IV
Textile Finishing Machinery Co.	Second Cover
Tinc Tura Laboratories, Inc.	IX
Tolhurst Machine Works	VI
United Aniline Co.	—
United Chemical Products, Inc.	XV
U. S. Color & Chemical Co.	XVI
Vellner, Eugene	—
Wolf, Jacques, & Co.	X

JENNINGS & COMPANY, Inc.

93 Broad Street Boston, Mass.

Every delivery of our Colors is guaranteed equal to standard. No shipment leaves our warehouses without closest scrutiny.

Our experts in the dyeing of leather and textiles are at the call of Manufacturers and Finishers. No charge is made for their time and experience.

The dyeing problem is complex. The cost of dyeing per unit of material is only one factor in the problem of successful merchandising. The effectiveness of that dyeing—its success in meeting trade conditions—is a factor even more important.

We are equipped to render a service unexcelled by any American distributor of dyestuffs by giving counsel and aid to accomplish best results in the dyehouse.

Let us render you this service

United States Color & Chemical Company, Inc.

93 Broad St. Boston, Mass.

New York Office: 25 Howard St.

FACTORIES:
NEW ENGLAND ANILINE WORKS, Inc.
Ashland, Mass.

GARFIELD ANILINE WORKS, Inc.
Garfield, N. J.

COLOUR INDEX

in the English Language

Edited by

F. M. ROWE, D.Sc., F.I.C.

assisted by
C. LEA, M. Sc. Tech.
and
A Large Revision Committee of Experts

Size **12½"** x **9½"** **371** Folios (**742** Pages)

Bound in Full Leather $32.00 **Bound in Full Cloth** $28.00

COLOUR USERS will find the "Alphabetical List" which sets out the various Makers of each Colour of the greatest use and assistance to them.

CONTENTS

SECTION A—Synthetic Organic Dyestuffs (291 folios).
SECTION B—Natural Organic Dyestuffs (10 folios).
SECTION C—Natural and Artificial Inorganic Colouring Matters (Mineral Pigments) (16 folios).
SECTION D—General Indices, Commercial Names, Patent Numbers, Intermediate Products, etc. (54 folios).

Commercial Names
Scientific Names
Components
Formula
Preparation
Discovery
Mode of Application
Literature
Description
Properties

of

Over 1300 Dyes

given, also a special column for purchaser's notes.

PUBLISHED AND ISSUED BY

The Society of Dyers and Colourists

PEARL ASSURANCE BUILDINGS, BRADFORD, YORKS., ENGLAND

For further particulars required apply THE SECRETARY

Over a Span of 51 Years

TO the unerring progress of Chemical control, the major productive powers of the Industrial World owe their full development.

Our contribution to this dynamic force spans a period of over a half century.

With justifiable pride, we therefore invite participation in a Chemical Service touching upon practically every phase of Industrial application—striking the highest average of successful attainment.

For Textile Manufacturers

BICHROMATES CAUSTIC POTASH
BETA NAPHTHOL PRUSSIATES
POTATO FLOUR DEXTRINE
FORMIC ACID STARCHES
PARANITRANILINE

Sizings • Softeners • Finishes
Dyestuffs and Colors

SULPHONATED OILS TURKEY RED OIL
CHROME CHLORIDE

A·KLIPSTEIN & CO.
644-52 Greenwich St.
NEW YORK CITY

Branches:
Boston Philadelphia Chicago Providence, R. I. Charlotte, N. C.

Represented in Canada by
A. KLIPSTEIN & CO., Ltd.
12 St. Peter St., Montreal

AKC